

## Liebert® NXL™

Operation and Maintenance Manual — 250-400kVA, 60Hz, Three Phase Single-Module



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# BATTERY CABINET PRECAUTIONS

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The following warning applies to all battery cabinets supplied with UPS systems. Additional warnings and cautions applicable to battery cabinets may be found in Important Safety Instructions and **3.4 - Battery Maintenance**.



## WARNING

Internal battery strapping must be verified by manufacturer prior to moving a battery cabinet (after initial installation).

- Battery cabinets contain non-spillable batteries.
- Keep units upright.
- Do not stack.
- Do not tilt.

Failure to heed this warning could result in smoke, fire or electric hazard.

Call 1-800-LIEBERT before moving battery cabinets (after initial installation).

## Contacting Liebert for Support

Contact Emerson Network Power Liebert Services for information or repair service in the United States at 1-800-LIEBERT (1-800-543-2378).

For repair or maintenance service outside the 48 contiguous United States, contact Liebert Services, if available in your area. For areas not covered by Liebert Services, the authorized distributor is responsible for providing qualified, factory-authorized service.

Have the following information available before calling Liebert Services:

Part Numbers: \_\_\_\_\_

Serial Numbers: \_\_\_\_\_

kVA Rating: \_\_\_\_\_

Date Purchased: \_\_\_\_\_

Date Installed: \_\_\_\_\_

Location: \_\_\_\_\_

Input Voltage/Frequency: \_\_\_\_\_

Output Voltage/Frequency: \_\_\_\_\_

Battery Reserve Time: \_\_\_\_\_

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## IMPORTANT SAFETY INSTRUCTIONS

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### SAVE THESE INSTRUCTIONS

This manual contains important instructions that should be followed during installation and maintenance of your Liebert NXL UPS and batteries.



#### WARNING

Risk of electric shock. Can cause equipment damage, injury or death.

Exercise extreme care when handling UPS cabinets to avoid equipment damage or injury to personnel. Refer to separate installation manual for equipment handling information and installation procedures.

Follow all battery safety precautions in **3.0 - Maintenance** when installing, charging or servicing batteries. In addition to the hazard of electric shock, gas produced by batteries can be explosive and sulfuric acid can cause severe burns.

In case of fire involving electrical equipment, use only carbon dioxide fire extinguishers or others approved for use in electrical fire fighting.

Extreme caution is required when performing maintenance. Service and maintenance work must be performed only by properly trained and qualified personnel and in accordance with applicable regulations as well as with manufacturers' specifications.

Be constantly aware that the UPS system contains high DC as well as AC voltages. With input power off and the battery disconnected, high voltage at filter capacitors and power circuits should be discharged within 30 seconds. However, if a power circuit failure has occurred, assume that high voltage still exists after shutdown. Check with a voltmeter before making contact.

AC voltage will remain on the system bypass, the UPS output terminals and the static bypass switch, unless associated external circuit breakers are opened.

Check for voltage with both AC and DC voltmeters prior to making contact.

When the UPS system is under power, both the operator and any test equipment must be isolated from direct contact with earth ground and the UPS chassis frame by using rubber mats.

Some components within the cabinets are not connected to the chassis ground. Any contact between floating circuits and the chassis is a lethal shock hazard. Exercise caution that the test instrument exterior does not make contact, either physically or electrically, with earth ground.

**This equipment contains circuitry that is energized with high voltage.** Only test equipment designated for troubleshooting should be used. This is particularly true for oscilloscopes. Always check with an AC and DC voltmeter to ensure safety before making contact or using tools. Even when the power is turned Off, dangerously high voltage may exist at the capacitor banks.

Observe all battery precautions when near the battery for any reason.

**ONLY properly trained and qualified service personnel should perform maintenance on the UPS system.** When performing maintenance on any part of the equipment under power, service personnel and test equipment should be standing on rubber mats. The service personnel should wear insulating shoes for isolation from direct contact with the floor (earth ground).

One person should never work alone. A second person should be standing by to assist and summon help in case an accident should occur. This is particularly true when work is performed on the battery.

## 1.0 INTRODUCTION

### 1.1 General Description

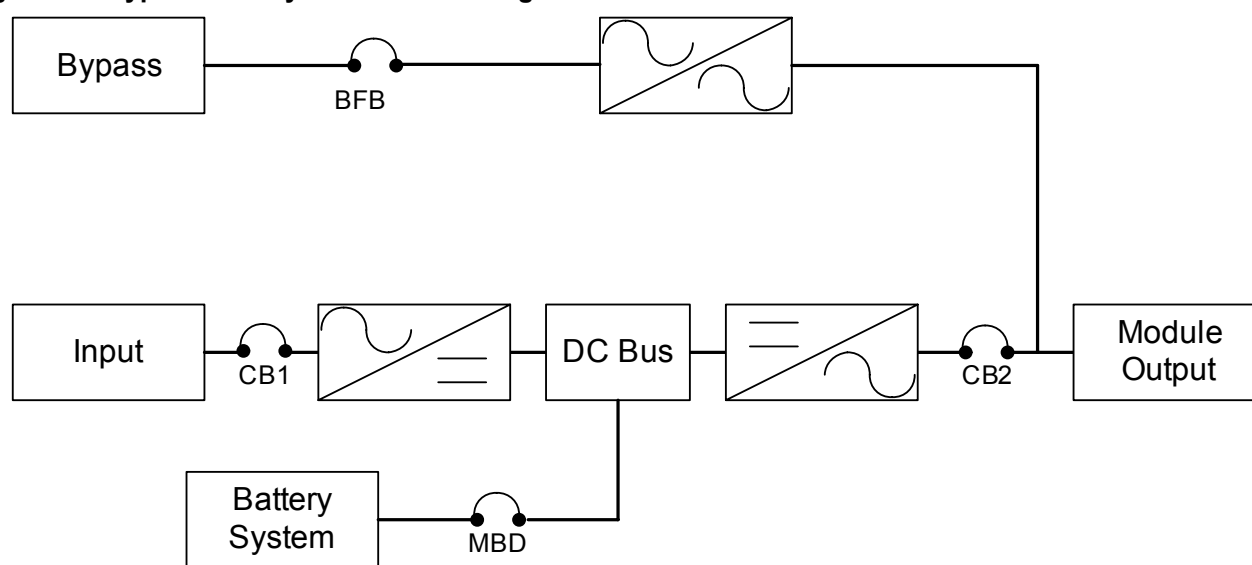
The Liebert NXL UPS provides continuous, high-quality AC power to your business-critical equipment, such as telecommunications and data processing equipment. The Liebert NXL UPS supplies power that is free of the disturbances and variations in voltage and frequency common to utility power, which is subject to brownouts, blackouts, surges and sags.

The Liebert NXL utilizes the latest in high-frequency, double-conversion pulse-width modulation technology and fully digital controls to enhance its reliability and increase the ease of use.

As shown in **Figure 1**, the AC utility source is input at CB1 and the rectifier converts the AC utility into DC power. The inverter converts that DC power from the utility—or DC power from the batteries—into AC power for the load. The batteries power the load through the inverter in the event of a power failure. The utility source can also power the load through the static bypass.

If maintenance or repair of the UPS is necessary, the load can be switched without interruption in service to the maintenance bypass.

**Figure 1** Typical UPS system one-line diagram



### 1.2 Modes of Operation

#### 1.2.1 Normal Mode

Operating in normal mode, the Liebert NXL's rectifier derives power from a utility AC source and supplies regulated DC power to the inverter, which regenerates precise AC power to supply the connected equipment. The rectifier also uses the utility source power to charge the batteries.



## 1.2.2 Bypass Mode

When the Liebert NXL is in bypass mode, the load is directly supported by utility power and is without battery backup protection.

The Liebert NXL's inverter and bypass static switch will shift the load from the inverter to bypass mode without an interruption in AC power if the inverter is synchronous with the bypass and any of the following occurs:

- Inverter fails
- Inverter overload capacity is exceeded
- Inverter is manually turned off by the user



### NOTE

*If the inverter is asynchronous with the bypass, the static switch will transfer the load from the inverter to the bypass **WITH** interruption in AC power to the critical load. This interruption will be less than 10ms. This interruption time may be altered by modifying the Output transfer interrupt time setting.*

## 1.2.3 Battery Mode

When utility AC power fails, the Liebert NXL protects the critical load by instantaneously channeling battery power to the inverter, which continues supporting the critical load without interruption.

When utility power returns and is within acceptable limits, the Liebert NXL automatically shifts back to Normal mode, with the rectifier powering the critical load.

## 1.2.4 Maintenance Bypass

The installation of a Maintenance Bypass Cabinet or Assembly is recommended to allow you to totally isolate the UPS from all power sources. Use of the Maintenance Bypass is described in **2.0 - Operation**.

## 1.3 Options

A number of options are available from Liebert for your UPS system. (Some options are not available for all ratings.) Described below are the most frequently provided options. **The first three battery items are required to complete the UPS system.** The remaining options provide improved system performance or convenience. Other options are available. Contact your Liebert sales representative for more information.

- **Battery and Racks**—The batteries provide power in the event of a power outage. The Liebert NXL UPS can use a variety of battery types, provided the battery plant is designed for the UPS DC voltage range and the load requirements of your application. This option is required to complete the UPS system.
- **Battery Cabinets**—Valve-regulated, lead-acid (VRLA) sealed batteries are available in matching cabinets for convenient installation and maintenance in otherwise unprotected space. Depending on the UPS module rating, two or more cabinets may be connected in parallel to provide the additional run time. This option is required to complete the UPS system.
- **Module Battery Disconnect**—The UPS system utilizes a separate Module Battery Disconnect for remotely located batteries. A sensing circuit in the UPS module, set at the battery low voltage limit, trips the Module Battery Disconnect to safeguard the battery from excessive discharge. The Module Battery Disconnect has an undervoltage release mechanism designed to ensure that during any shutdown or failure mode all battery potential is removed from the UPS system. This option is required to complete the UPS system.
- **Input Current Distortion Filter**—This filter reduces input current reflected harmonic distortion to less than 7% reflected THD at full load. The filter is factory-installed in the UPS. This filter also improves the input power factor to better than 0.92 lagging at full load.
- **Two Breaker Maintenance Bypass**—This switchboard provides make-before-break maintenance bypass. It includes: Maintenance Bypass Breaker (MBB) and Maintenance Isolation Breaker (MIB).

- **Load Bus Synchronization**—The Load Bus Sync (LBS) option keeps two independent UPS systems (and therefore their critical load buses) in sync, even when the modules are operating on batteries or asynchronous AC sources. This means that critical loads connected to both load buses can switch seamlessly between the two.
- **Customer Alarm Interface**—This optional interface board allows the input and display of eight alarms from customer-supplied contacts, each with a customer-selected name of up to 19 characters. The following attributes can be programmed for each alarm: latching, audible, event log and time delay (0 to 99.9 seconds).
- **Temperature-Compensated Charging**—When the battery temperature exceeds a preset limit (typically 77°F [25°C]), this optional circuit proportionally reduces float charging voltage to prevent overcharging the battery.
- **Battery Load Testing**—When activated, this option forces the battery string to assume the load for a short period of time. The UPS then compares the test results to data collected during the UPS commissioning to see if the battery system appears to meet specifications.

The Liebert NXL will display status events for Battery Equalize, Battery Self-Test and Battery Commissioning when those options are active.

## 2.0 OPERATION

The Liebert NXL UPS is equipped with a microprocessor-based display touchscreen designed for convenient and reliable operation. The display is driven by an easy-to-follow, menu-prompted software.

### 2.1 Features

The Liebert NXL interface display enables the operator to perform such tasks as:

- Quickly check operational status
- Monitor the power flow through the UPS system and all meter readings
- Execute operational procedures
- Check status reports and history files
- Adjustment programmable parameters (access limited by security access function)
- Adjustment output voltage before performing a manual load transfer.

The touchscreen is a white-background display with multicolor text. The display turns on automatically, but after 15 minutes of inactivity the backlight will go out and the display will appear very dim. Touching the screen will reactivate the backlight; the backlight will again be active for 15 minutes. If any screen other than the mimic screen is accessed, that screen will be displayed for 5 minutes without any interaction. If there is no activity for 5 minutes, the display will revert to the basic mimic screen.

**Figure 2 Main component locations**

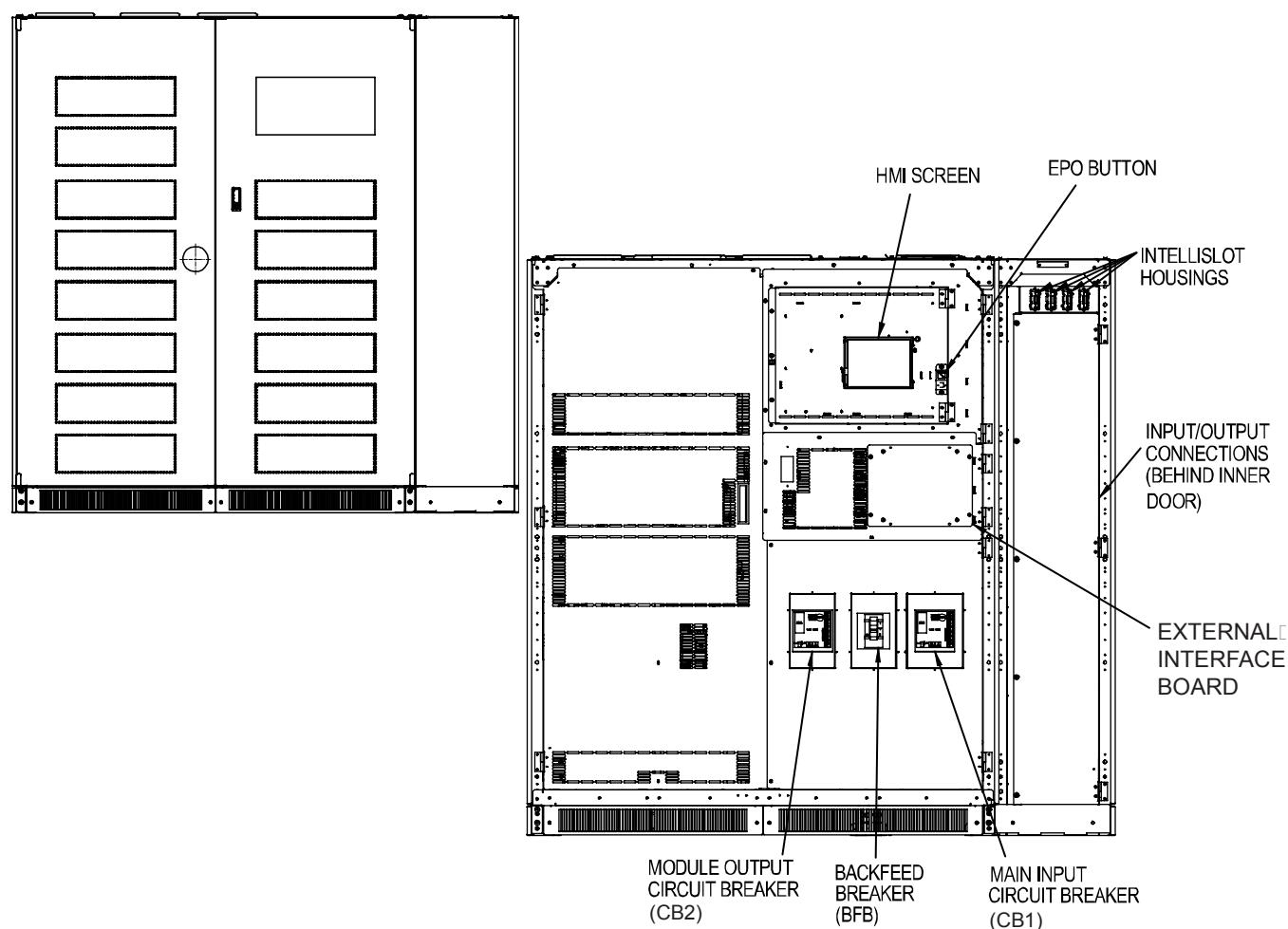


Figure 3 Main Display Screen, typical

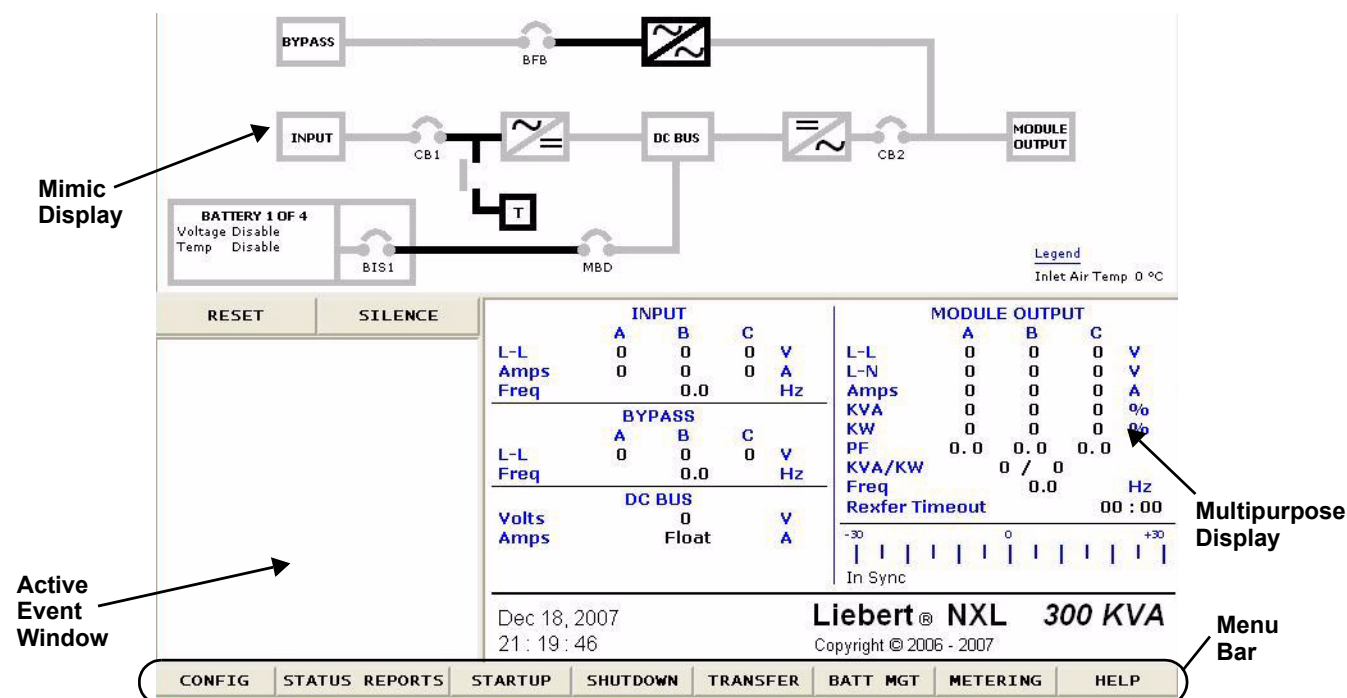
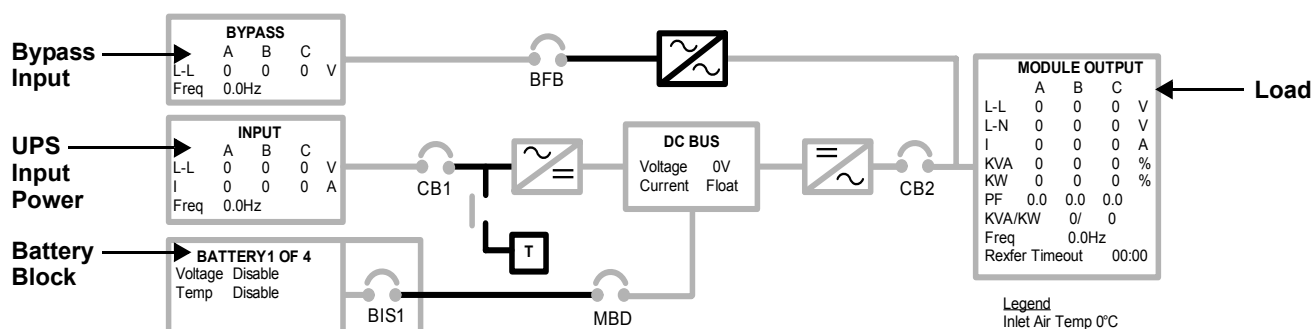


Figure 4 Mimic display



**Bypass Input**—Displays the bypass input voltage and the bypass input frequency. The bypass circuit breaker (BFB) is to the right of this block. The circuit breaker status is shown as open or closed.

**UPS Input Power**—Displays the UPS input voltage, current and frequency. The input circuit breaker (CB1) is to the right of this block. The circuit breaker status is shown as open or closed.

**Battery Block**—Displays the battery voltage and the charge or discharge current to or from the battery. Pressing this icon switches among the connected battery strings. The Module Battery Disconnect (MBD) is to the right of this block. The circuit breaker status is shown as open or closed.

**DC Bus**—Displays the DC Bus voltage and the state of the battery charger.

**Load**—Displays the output line voltage, phase voltage, current, kVA, kW, power factor and frequency. The critical load current per phase is also displayed in this block. During an overload, the time remaining before transfer is displayed at the bottom of the load box. After an overload transfer, retransfer timeout is displayed at the bottom of the load box.

Figure 5 Monitor/mimic display example: Normal power flow

Green – Normal  
Orange – Marginal  
Gray – Absent  
Black – Unknown

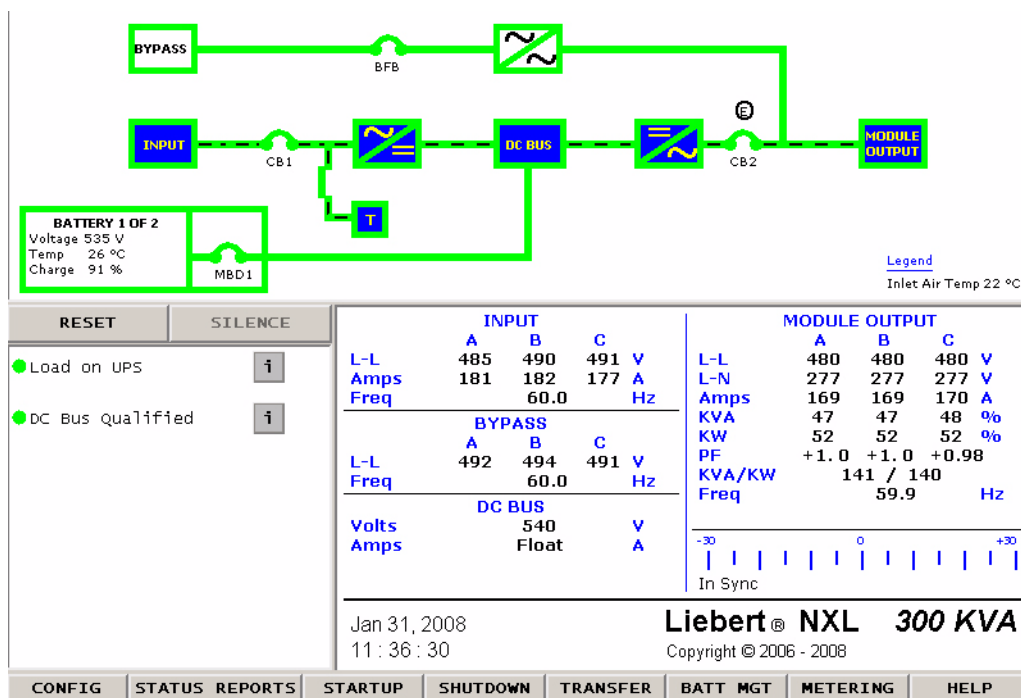
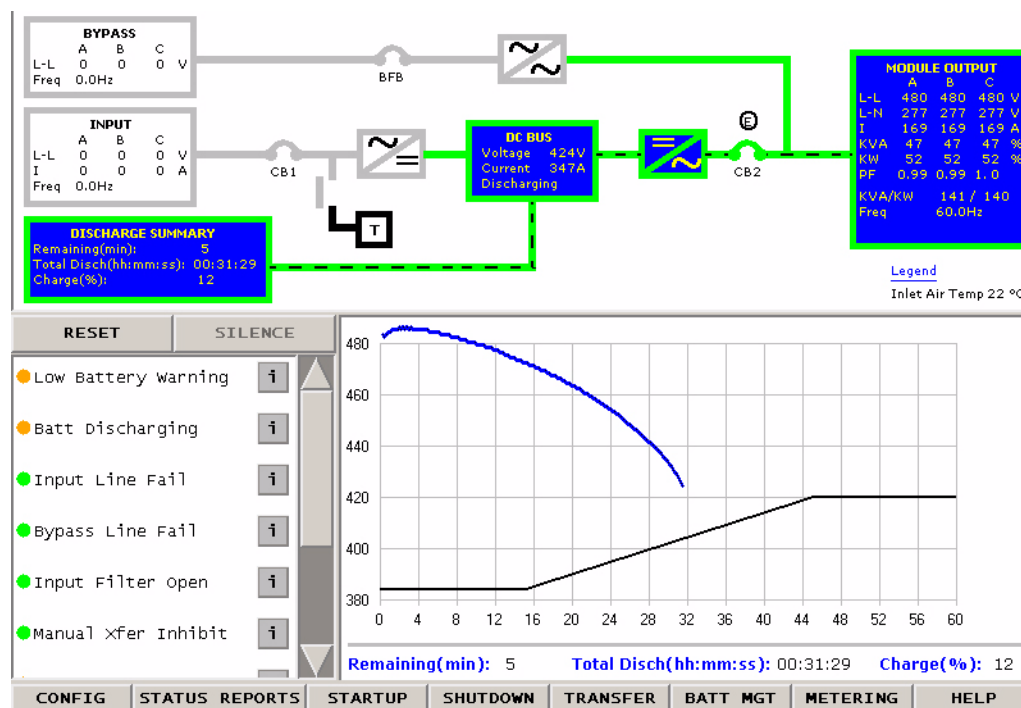
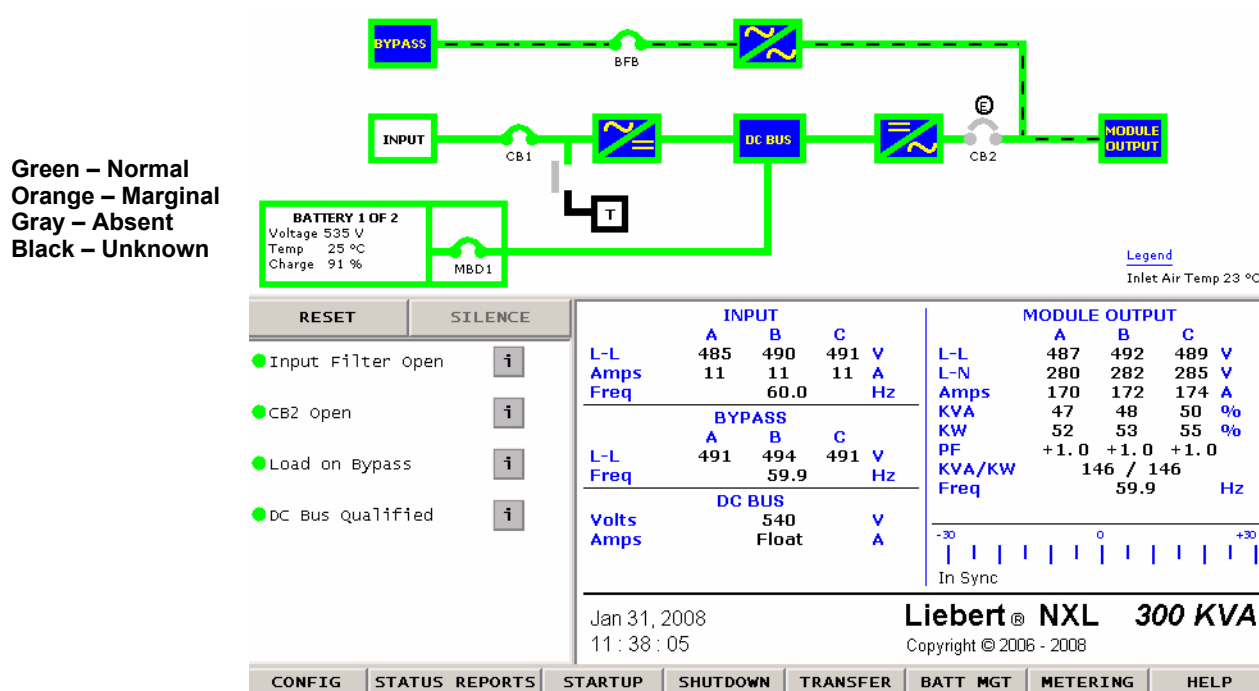


Figure 6 Monitor/mimic display example: Utility fail

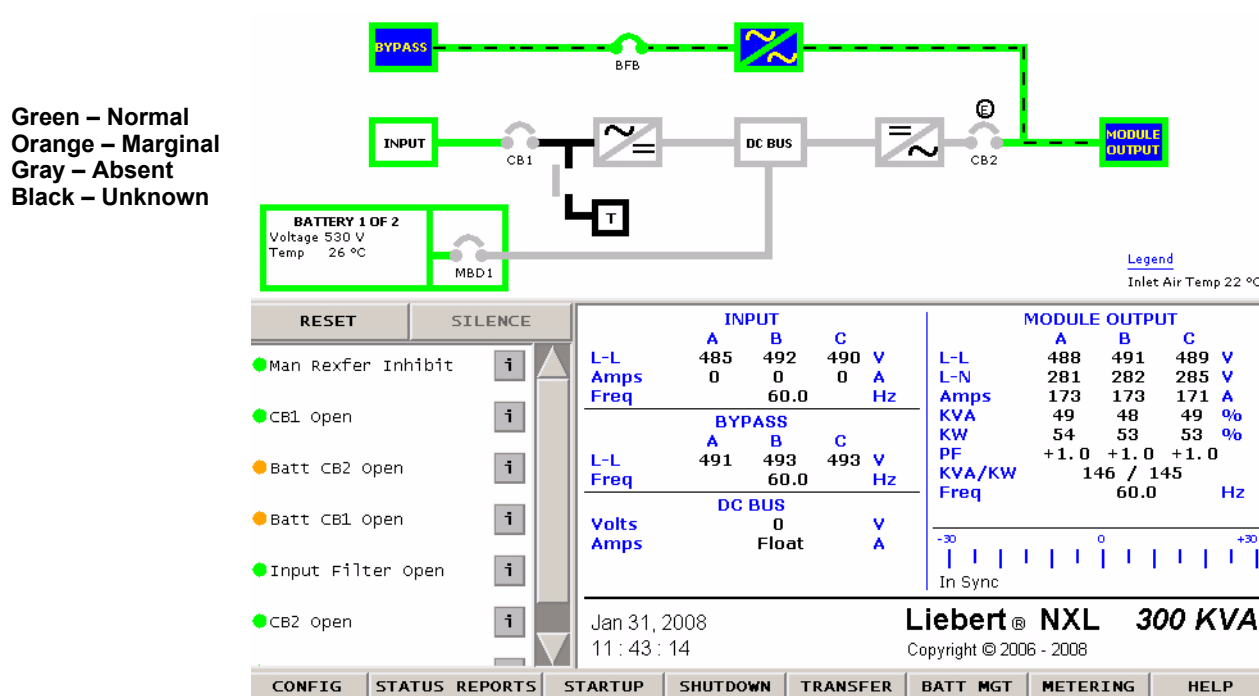
Green – Normal  
Orange – Marginal  
Gray – Absent  
Black – Unknown



**Figure 7 Monitor/mimic display example: Load on bypass, UPS On**



**Figure 8 Monitor/mimic display example: Load on bypass, UPS module off**

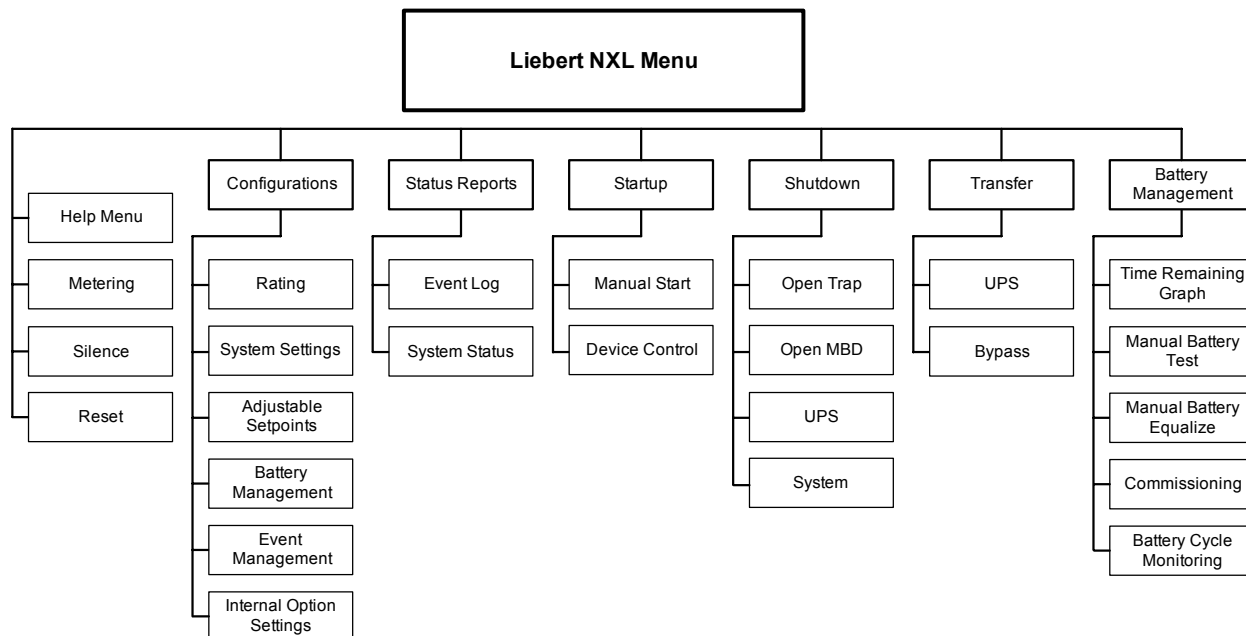


## 2.2 Touchscreen Navigation

### 2.2.1 Main Display Screen

Several menu items can be accessed from the main display screen (see **Figure 3**). These menu items are detailed in subsequent sections.

**Figure 9** Menu tree



## 2.2.2 Configurations Menu

### Rating

This menu item will display a popup showing the following parameters (see **Figure 10**). These parameters are entered during commissioning when the UPS is installed.

- Nominal Input Voltage
- Nominal Bypass Voltage
- Nominal Output Voltage
- Nominal Source Frequency
- Nominal Output Frequency
- Nominal Cell Count
- Output kVA
- Output KW
- Configuration Type
- Rectifier Type
- Input Isolation Transformer
- Unit Model
- Unit Serial
- Maintenance Bypass Model
- Maintenance Bypass Serial
- Battery Cabinet Model
- Battery Cabinet Serial
- Order Number 1
- Order Number 2
- Service Telephone Number
- Site ID Number
- Tag Number

**Figure 10 Rating Parameters**

Nominal Input Voltage	480
Nominal Bypass Voltage	480
Nominal Output Voltage	480
Nominal Source Frequency	60.0
Nominal Output Frequency	60.0
Nominal Cell Count	240
Output KVA	300
Output KW	270
Configuration Type	SMS 44
Rectifier Type	6P, F
Input Isolation Transformer	No
<a href="#">More &gt;&gt;</a>	
<a href="#">Close</a>	

Unit Model	40sa300aaaac
Unit Serial	
Maintenance Bypass Model	
Maintenance Bypass Serial	
Battery Cabinet Model	
Battery Cabinet Serial	
Order Number 1	
Order Number 2	
Service Telephone Number	
Site ID Number	
Tag Number	
<a href="#">Close</a>	



## User Settings

### System Settings

These display settings can be changed from the touchscreen. Press the box to the left of each parameter to bring a popup window that will allow the parameter to be changed.

- Backlight Brightness—High or Low (default: Low)
- Time (24hr format)—Adjust Hour, Minute or Seconds
- Date (MM DD, YYYY format)—Adjust Month, Day or Year
- Password – Reset the password (4 characters, alphanumeric, case-sensitive)
- Language—English, Chinese, French, Spanish, German, Italian, Portuguese
- Audio level—Range 1 to 10 (default: 5)
- Phase labeling—Auto, ABC, RST, XYZ, RYB, RWB, UVW, 123, L1L2L3 (default: Automatic)
- Unit Locator
  - Location ID—Alphanumeric
  - System Number—Alphanumeric
  - Unit Number—Number (1 through 99)
  - Unit Label—Alphanumeric

**Figure 11** System Settings parameters

The screenshot displays a 'System Settings' menu with a light beige background. At the top, 'Backlight Brightness' is set to 'Low' (indicated by a darker button). Below this, several settings are listed, each with a small square icon to its left: 'Time' is '18 : 42 : 32', 'Date' is 'Dec 20, 2007', 'Password' is 'xxxx', 'Language' is 'English', 'Audio Level' is '0', 'Phase Labeling' is 'Auto', and 'Unit Locator' is currently empty. At the bottom of the menu are 'Save' and 'Cancel' buttons.

Parameter	Value
Backlight Brightness	Low
Time	18 : 42 : 32
Date	Dec 20, 2007
Password	xxxx
Language	English
Audio Level	0
Phase Labeling	Auto
Unit Locator	

## Adjustable Setpoints

These warning and alarm settings can be changed from the touchscreen. Press the box to the left of each parameter to bring a popup window that will allow the parameter to be changed.

### Max Load Alarm

- Phase A (%)—10% to 105% (default: 95%)
- Phase B (%)—10% to 105% (default: 95%)
- Phase C (%)—10% to 105% (default: 95%)
- Delay (second)—0 to 60 (default: 5 seconds)

### Manual Xfer Bypass Voltage Limits

- Manual Xfer Bypass Voltage Low Limit (%)—1% to 20% (default: 5%)
- Manual Xfer Bypass Voltage High Limit (%)—1% to 15% (default: 5%)

### Inlet Air Temp Warning

- Inlet Air Temp Warning—30°C to 40°C (default: 35°C)



#### NOTE

*Temperature will display in both Celsius and Fahrenheit.*

**Figure 12 Adjustable setpoints parameters**

The figure displays three separate popup windows for adjusting system parameters. Each window has a 'Save' and 'Cancel' button at the bottom.

- Max Load Alarm Window:** Contains four input fields: 'Phase A (%)', 'Phase B (%)', 'Phase C (%)', and 'Delay (seconds)'. All fields currently show the value '0'.
- Manual Xfer Bypass Voltage Limits Window:** Contains two input fields: 'Manual Xfer Bypass Voltage Low Limit (%)' and 'Manual Xfer Bypass Voltage High Limit (%)'. Both fields currently show the value '0'.
- Inlet Air Temp Warning Window:** Contains one input field for 'Inlet Air Temp Warning'. It features dual temperature displays, showing '0 °C' and '32.0 °F'.

## Battery Management

These battery settings can be changed from the touchscreen. Press the box to the left of each parameter to bring a popup window that will allow the parameter to be changed.

### Battery Equalize:

- Equalize Voltage, Vpc - 2.30 to 2.40 (default: 2.3)
- Equalize Time, hours - 0 to 200hours (default: 0)



#### NOTE

*Battery Equalize must be enabled by service to be functional. If Battery Equalize is disabled, the feature will not be available and the menu item will not be displayed.*

## Battery Test

- Auto Test—Enable/Disable (default: disabled)
- Test Cycle, weeks—1 to 26 (default: 13 weeks)
- Time of day, hh:mm—Set Hour and Minute; sets the start time of the automatic battery test
- Start Date, mm dd, yyyy—Set Month, Day and Year
- Test Duration, minutes—Automatic, 0.5 minute to 30% of full load Operating Time (default: automatic)
- Minimum Battery Voltage, lead-acid only—1.75VPC to 1.95VPC (default: 1.75VPC); this is the minimum voltage the battery test will stop.

## Low Battery Warning Time

- Low Battery Warning Time, minutes—2 to 60, depending on configured batteries (default: 5 minutes)

## Battery Temperature

- Battery Temp Warning—30°C to 50°C (default: 40°C)
- Battery Temp Limit—35°C to 60°C (default: 50°C)
- Disconnect—Enable/Disable (default: disabled)



### NOTE

*If Disconnect is set to “Enable” and the Battery Temp Limit is met, the Battery breaker will open.*

**Figure 13 Battery Management Parameters**

The figure displays four screenshots of the battery management interface, arranged in a 2x2 grid. Each screenshot shows a different set of parameters for configuration.

- Top-left screenshot:** Shows the 'Auto Test' settings. It includes a checkbox for 'Auto Test' (currently 'En'), and fields for 'Test Cycle (weeks)' (0), 'Time of Day (hh:mm)' (00:00), 'Start Date (mmm dd, yyyy)' (Jan 1, 1970), 'Test Duration (minutes)' (0.0), and 'Minimum Battery Voltage' (0.00 VpC, 0 V). 'Save' and 'Cancel' buttons are at the bottom.
- Top-right screenshot:** Shows the 'Low Battery Warning Time (minutes)' field set to 0. 'Save' and 'Cancel' buttons are at the bottom.
- Bottom-left screenshot:** Shows the 'Float Voltage' settings. It includes a checkbox for 'Float Voltage' (currently 'En'), and fields for 'Float Voltage' (2.25 VpC, 540 V). 'Save' and 'Cancel' buttons are at the bottom.
- Bottom-right screenshot:** Shows the 'Cell Count Adjustment' settings. It includes a checkbox for 'Cell Count Adjustment' (currently 'En'), and fields for 'Cell Count Adjustment' (0) and 'Actual Cell Count Adjustment' (240). 'Save' and 'Cancel' buttons are at the bottom.

## Cell Count Adjustment

- Cell Count Adjustment— -12 cells to +6 cells (default: 0)

## Float Voltage

- Battery Float Voltage, Vpc—2.15 to 2.3 (default: 2.25)

## Event Management

This menu item permits changing how the Liebert NXL handles Alarms, Faults and Status information. Each event can be configured for the following:

- Latch (yes/no)—Event stays active in the event window, even if the fault condition has been cleared, until user acknowledges it by pressing the “Reset” button.
- Audible (yes/no)—Will set Audible alarm when event occurs
- Event log (yes/no)—Will display event in Event log when it occurs



### NOTE

*You must press “Save” for changes to take effect.*

See **Table 7** for a list of alarms, fault and status messages.

**Figure 14 Typical Event Management Parameters**

Status	Latch	Audible	Event Log
Batt Equalizing	No	No	No
Batt Self Test	No	No	No
Batt Test Inhibit	No	No	No
Batt Test Passed	No	No	No
LBS Operating	No	No	No
Load on Bypass	No	No	No

Alarms   Faults   **Status**   Save   Cancel

### 2.2.3 Status Reports Menu

This menu accesses the events records.

- Event Log—Up to 1024 time/date stamped events are captured in the log. The oldest record will be overwritten with a new record once the buffer reaches 1024 events.
- System Status
  - Total Operating Hours—Total number hours the UPS has been operational
  - Battery Operating Time—A running total of the battery discharge time for all events since the log was last cleared

### 2.2.4 Startup Menu

This menu is used to start the UPS and individual devices.

**Manual**—This will begin the UPS startup. See **2.4 - Manual Procedures** for details.

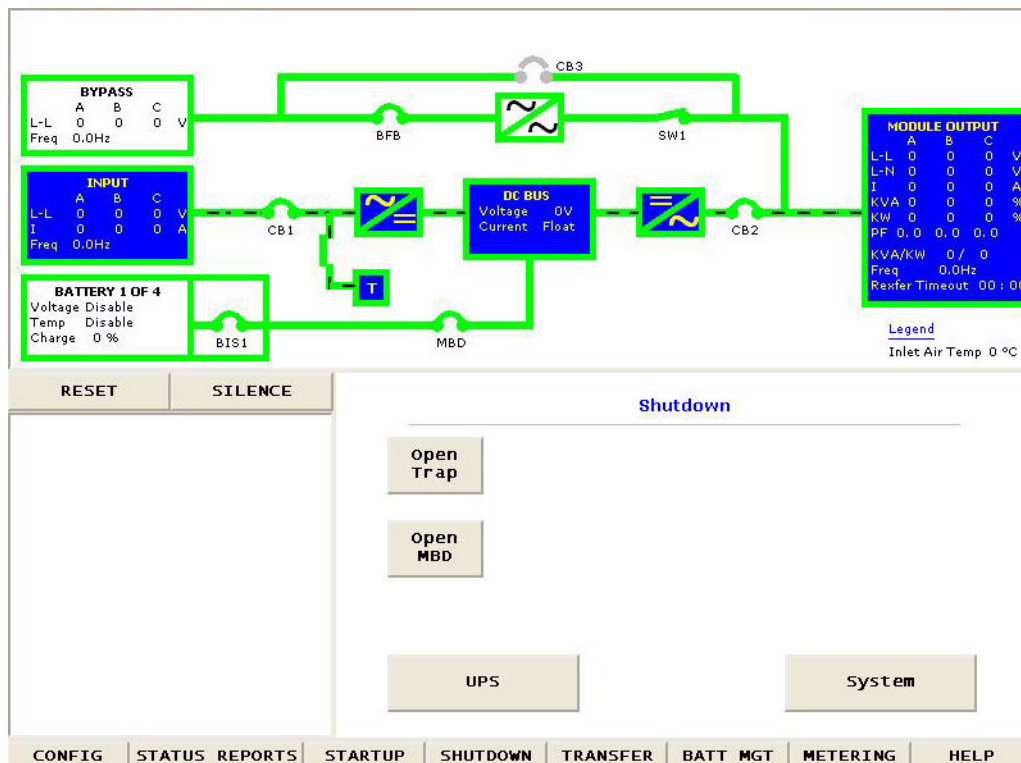
#### Devices

- Close Trap—This will start the Input filter, if installed
- Close MBD/BCB—If MBD is motor operated, the Close command will Enable and energize the motor to close. If MBD is not motorized, the Close command will Enable the breaker UVR. The MBD/BCB must be closed manually. If no MBD is selected, do not display this setting.

## 2.2.5 Shutdown Menu

This menu permits shutting down the UPS and individual devices.

**Figure 15 Shutdown menu**



**Open Trap**—Open the input trap filter

**Open MBD/BCB**—Opens the associated MBD or BCB breaker

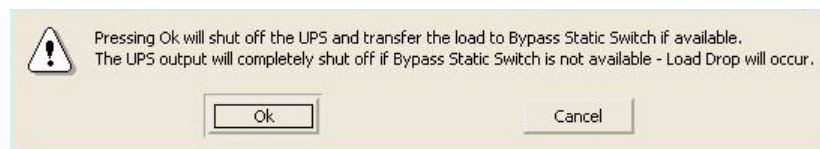
**UPS**—Turns off inverter, rectifier and trips all battery breakers. Transfers to bypass, if available.



### NOTE

*The following popup window is displayed when the UPS is about to be shut down. To shut down the UPS, an operator must press OK.*

**Figure 16 UPS shutdown popup**



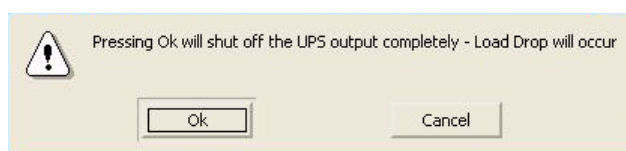
**System**—Turns off inverter, rectifier and trips all battery breakers. Will shutdown UPS completely.

## NOTICE

Risk of equipment damage. This command will result in the load being shut down.

The following popup window is displayed when the UPS is about to be shut down. To shutdown the UPS, an operator must press OK.

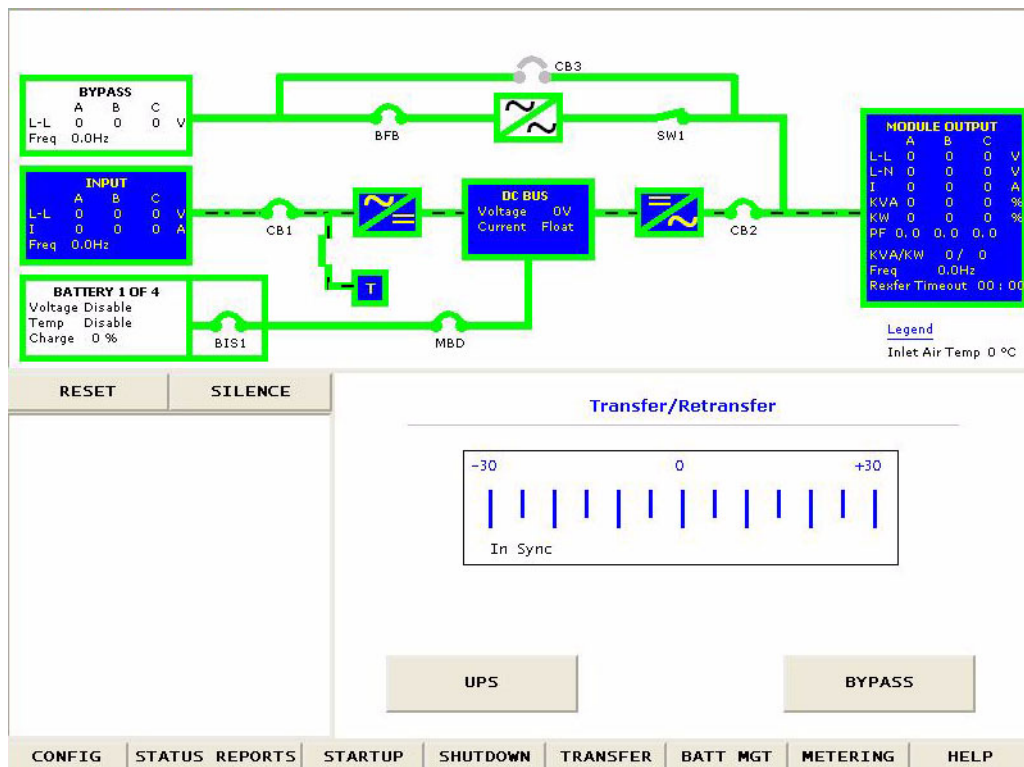
**Figure 17 System shutdown popup**



## 2.2.6 Transfer Menu

This menu permits switching between UPS and Bypass mode. A graph in the multipurpose window shows if the UPS is in synch with the bypass. If the UPS and bypass are in synch, pressing **Bypass** will switch the UPS to Bypass mode. Pressing **UPS** will switch back to Normal (Inverter) Mode (see Figure 18).

Figure 18 Transfer/retransfer commands

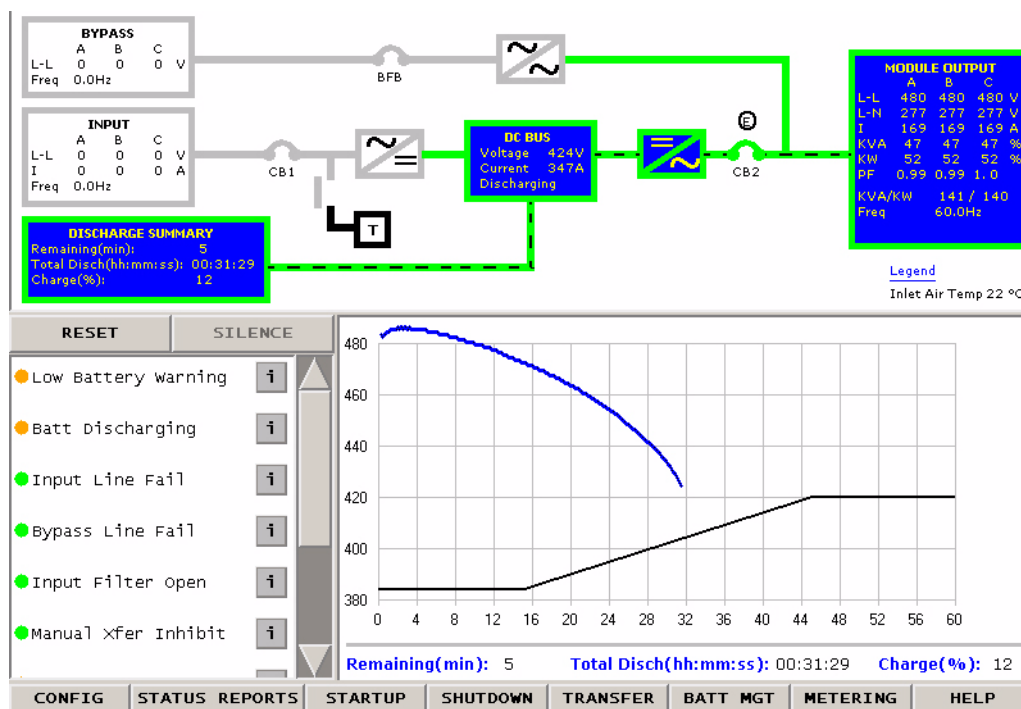


## 2.2.7 Battery Management Menu

This menu permits configuring battery settings.

**Time Remaining Graph**—Displays the time remaining graph in the multipurpose window; plot the battery voltage against elapsed time during a Battery Discharge Cycle (see **Figure 19**).

**Figure 19** Time remaining display



**Manual Battery Test**—Start/Stop

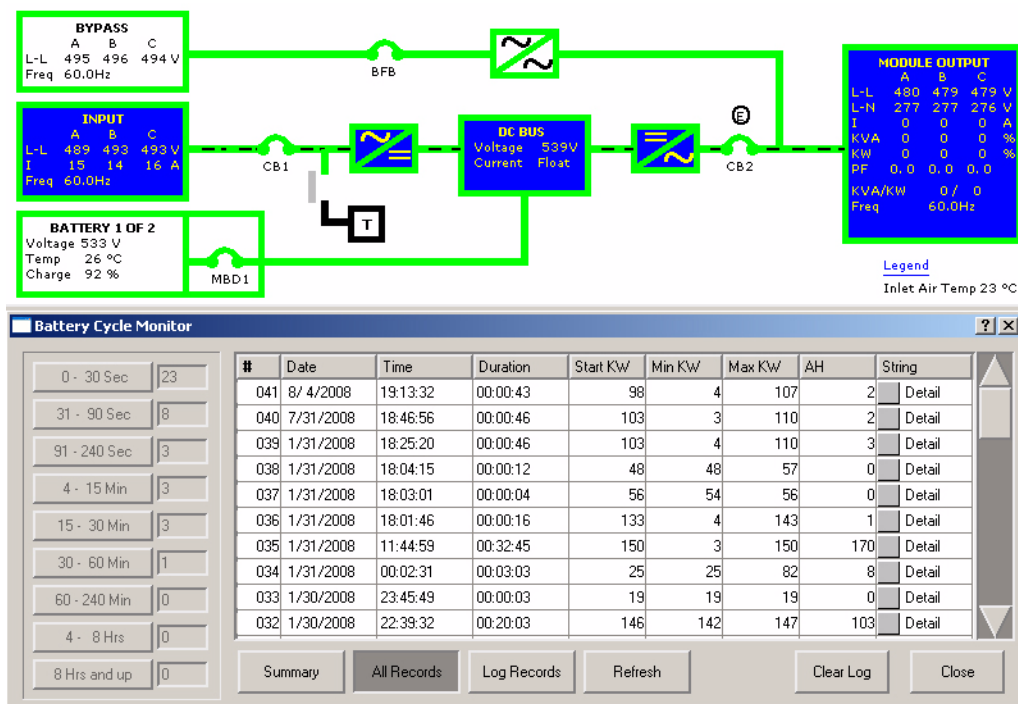
**Manual Battery Equalize**—For Service only.

**Commissioning**—For Service only.

**Battery Cycle Monitor**—Displays how many discharges have occurred for these time periods: 0-30sec, 31-90sec, 91-240sec, 4-15min, 15-30min, 30-60min, 60-240min, 4-8hrs, 8hrs and up. Each discharge record will include: (see **Figure 20**)

- #
- Date
- Time
- Duration
- Start KW
- Min KW
- Max KW
- AH
- Start Temp °C
- End Temp °C
- Battery CB Start
- Battery CB End

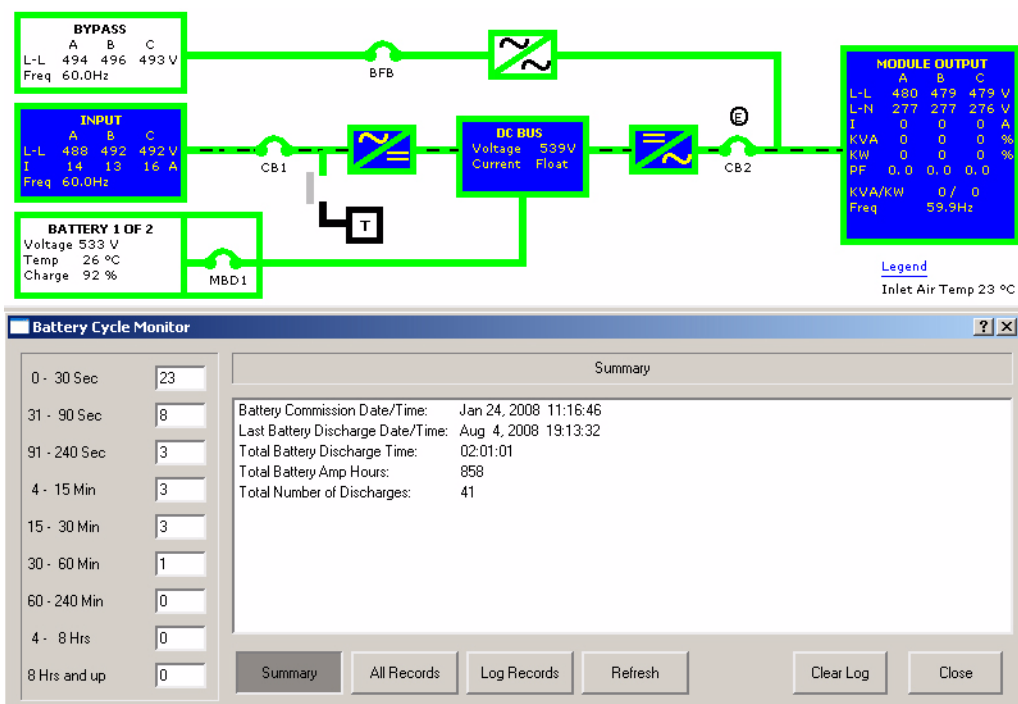
Figure 20 Battery cycle monitor



Display summary (see Figure 21)

- Battery Commission Date/Time
- Last Battery Discharge Date/Time
- Active Battery Discharge Time
- Active Battery Amp Hours
- Active Battery KW
- Total Number of Discharges

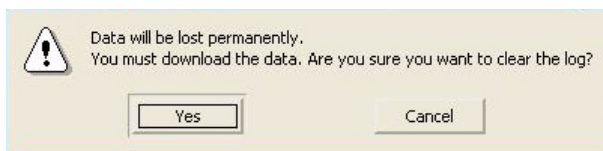
Figure 21 Battery cycle monitor summary





**Clear Log**—This command resets the Date of First Discharge Cycle. A dialog box will warn that the data will be permanently lost and should be downloaded before proceeding (see **Figure 22**).

**Figure 22 Battery cycle monitor—clear log**



## 2.2.8 Metering

This button will place the metering tables in the multipurpose window.

## 2.2.9 Help

This button will display the help menu.

## 2.2.10 Reset

This button will reset any non-active latched events.

## 2.2.11 Silence

This button will silence the audible alarm.

## 2.3 Modes of Operation

This section illustrates the flow of power through circuit breakers, switches and UPS components during various modes of operation. The same modes of operation apply to all configurations of the Liebert NXL. Highlighted (thick) lines in the diagrams indicate power flow and power availability.

These illustrations do not show an alternate power source (generator) and automatic transfer switch (external to the UPS) that might be present at your installation.

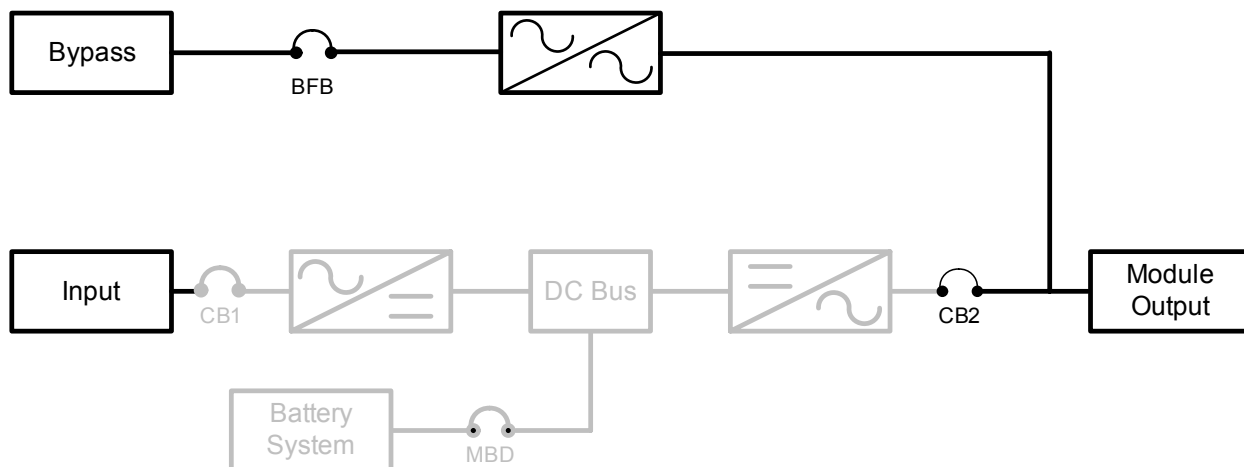
### 2.3.1 Load on Bypass

Load on Bypass, with the UPS not available, is shown in **Figure 23**. The UPS system could be in this mode of operation during either initial startup or UPS system shutdown and isolation for maintenance.

## NOTICE

Risk of equipment damage. When the critical load is being supplied power from the bypass line, it is exposed to utility failure and fluctuations.

**Figure 23 Load on bypass (UPS not available)**



### 2.3.2 OK to Transfer

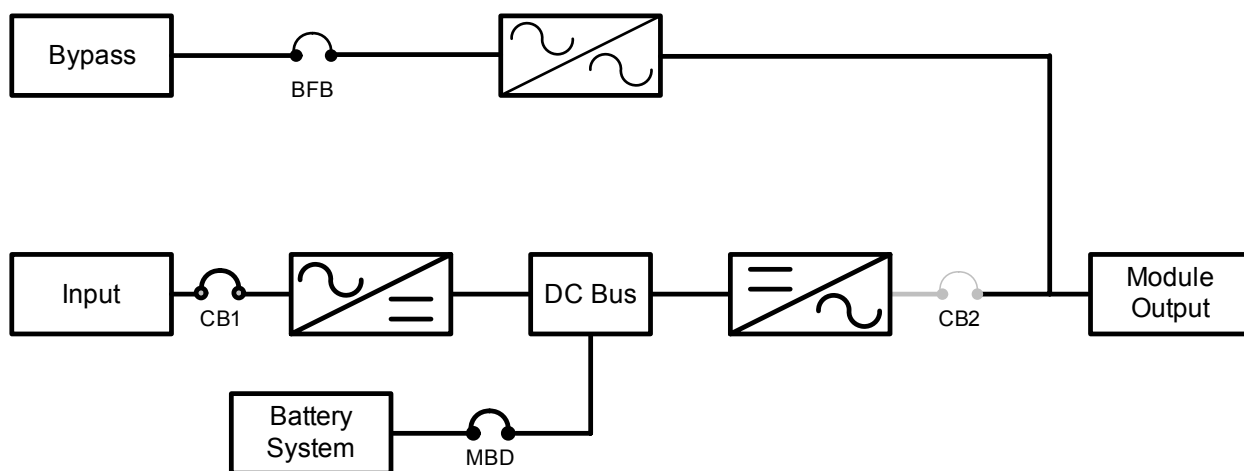
The OK to Transfer status message will be displayed when the bypass line and UPS output power are both available, their voltage, frequency and phase synchronization are matched within specifications, and the Static Switch Disconnects are closed (ON). An alarm message may be displayed to indicate Load On Bypass (**Figure 24**). If no alarm is displayed, the operating status is Load On UPS (**Figure 25**).

When the OK to Transfer message is displayed, the load can be manually transferred from the UPS to bypass or the load can be manually retransferred from the bypass to the UPS.

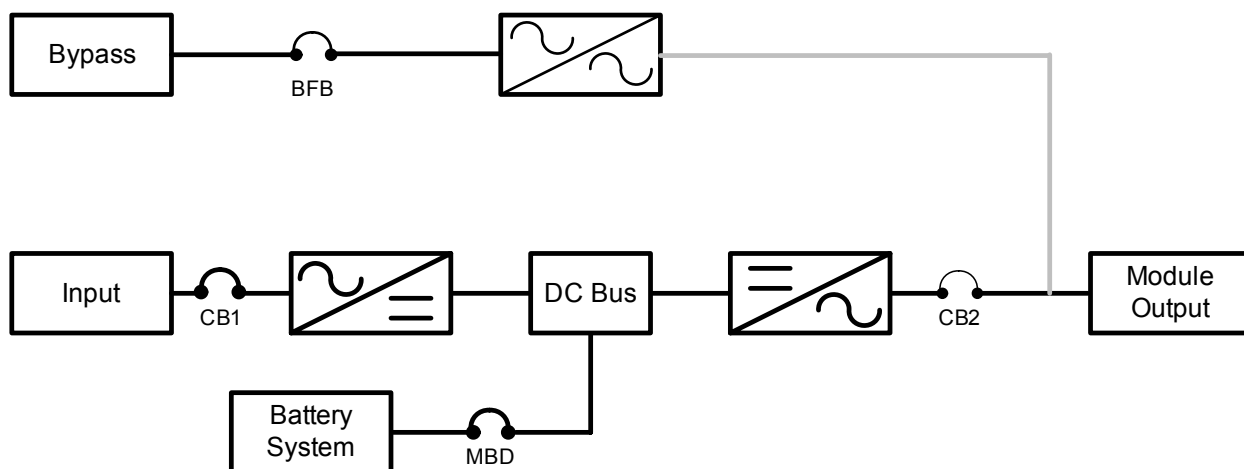
To perform a manual transfer, Use the Load Transfer Procedures screen. Refer to **2.4.2 - Load Transfer Procedures**.

The UPS control logic will initiate an automatic transfer to bypass if an overload condition exceeds the system current versus time window or if a UPS fault is detected. The control logic may initiate an automatic retransfer to the UPS system when the system is recovering from overloads lasting less than five minutes. Refer to **2.6 - Automatic Operations**.

**Figure 24 Load on bypass, UPS available**



**Figure 25 Load on UPS, bypass available**



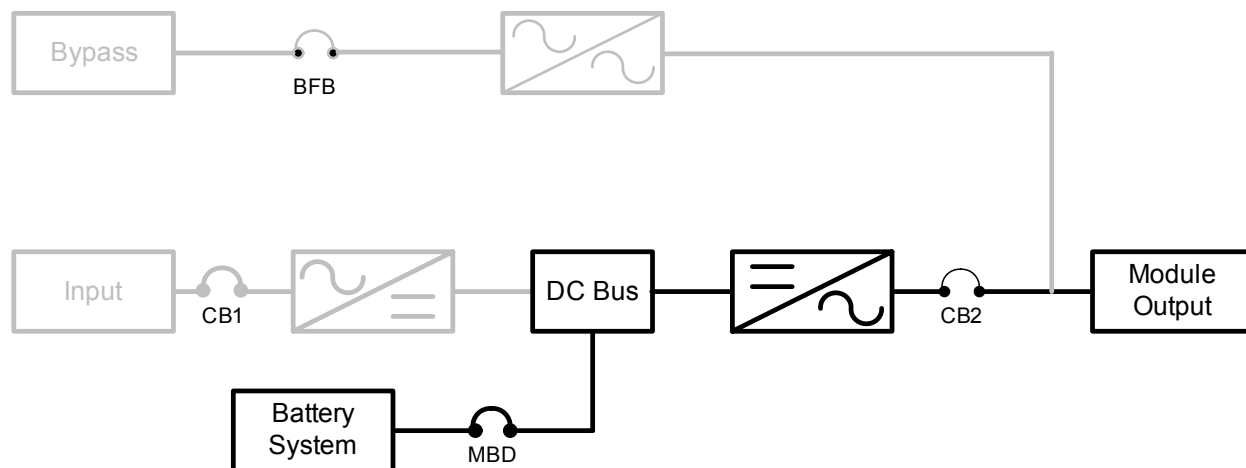
### 2.3.3 Input Power Failure—Load on Battery

If the utility AC power source fails or is outside the acceptable range, the battery plant becomes the power source for the UPS module inverters. The UPS continues to supply power to the critical load and also to the UPS controls.

Use the Battery Time screen at the UPS modules to monitor the present battery voltage compared to the shutdown value. The time the battery can sustain the load depends on the size of the load and the size and condition of the battery plant.

Alarm messages that indicate battery status are Battery Discharge, Low Battery and Battery Shutdown. The voltage limits for these alarms are displayed on the UPS module Alarm Limit Settings screen. These limits were selected for your installation by Liebert Services during initial startup. The battery block in the UPS module Monitor/Mimic Display indicates Charge or Discharge and the current in amperes.

**Figure 26** Input power fail, load on battery



### 2.3.4 Off Battery

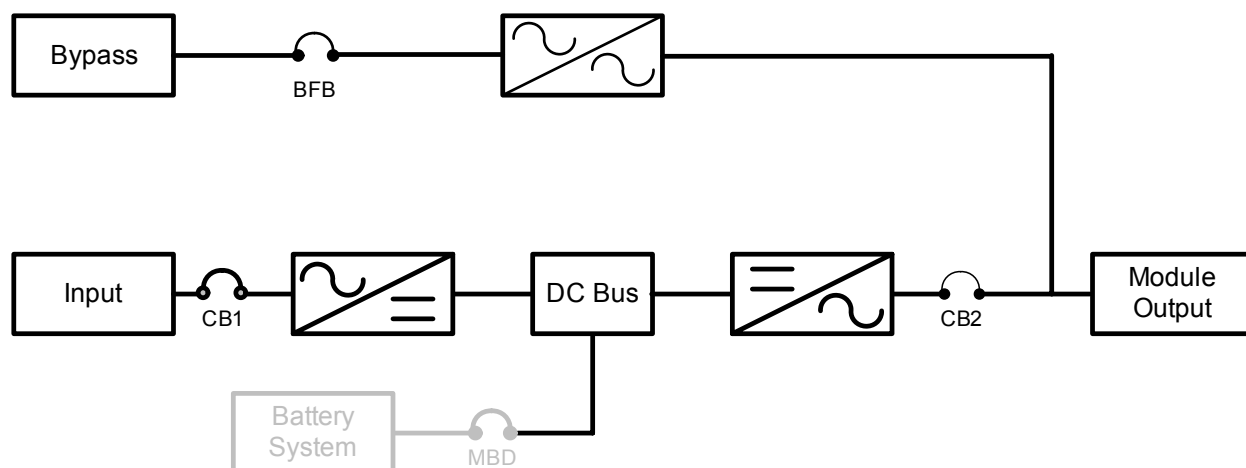
The battery plant can be disconnected from the UPS, if required for battery maintenance, by opening the module battery disconnect (MBD) circuit breaker. In this situation the UPS module will continue to supply conditioned power to the critical load, but if input power fails the UPS system cannot supply power to the load.



## CAUTION

When the UPS system is operating with the module battery disconnect (MBD) circuit breaker(s) open, the critical load is not protected from loss of the utility source power.

**Figure 27 Load on UPS, battery not available**



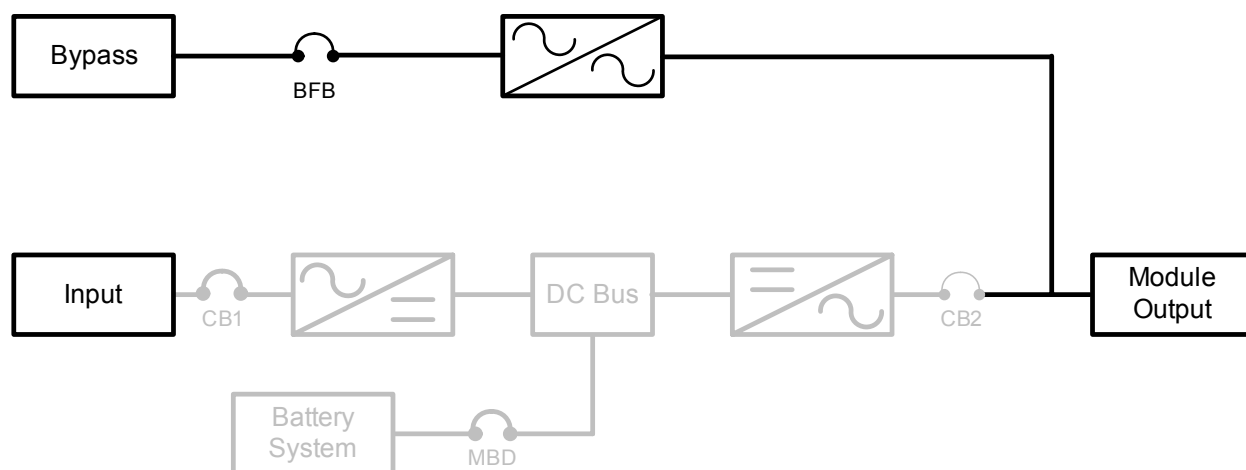
### 2.3.5 Emergency Module Off

The Local Emergency Module Off (LEMO) mode will transfer the critical load to the bypass line and remove power from all UPS module components except the controls, bypass circuit breaker and the static switch.

The Emergency Module Off control is a guarded pad next to the display touchscreen (**Figure 2**).

Lift the cover and press the pad. The load will be transferred to bypass, and the battery (MBD), input and output circuit breakers will be opened (tripped). Refer to **2.5 - Shutdown Procedures**.

**Figure 28 Emergency modules off**



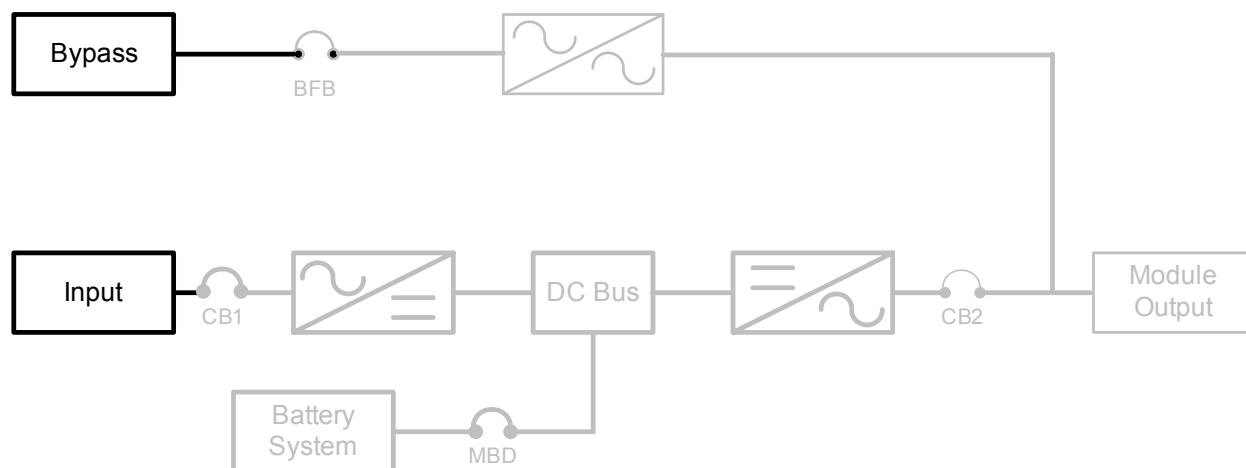
### 2.3.6 Remote Emergency Power Off

The Remote Emergency Power Off (REPO) mode will transfer the critical load to the bypass line and remove power from all UPS module components except the controls, bypass circuit breaker and the static switch.

The Remote Emergency Power Off control is a user-provided switch located remotely from the UPS system. It usually is installed in the same room as the critical load equipment. This mode can also be initiated by an automatic contact closure in the same external circuit as the manually operated switch.

When the Remote Emergency Power Off switch is operated, all UPS circuit breakers are opened, including the bypass circuit breaker. All power through the UPS is removed from the load. Typically, the REPO circuit also opens the circuit breakers that provide power to the bypass lines and the UPS controls. Refer to **2.5 - Shutdown Procedures**.

**Figure 29 Remote emergency power off**



## 2.4 Manual Procedures

The Liebert NXL UPS is designed to function while unattended by an operator. Many important functions are handled automatically by the system control logic, as explained in **2.6 - Automatic Operations**. Other procedures must be performed manually.

Manual procedures available to the operator include Startup, Load Transfers and Shutdowns. These procedures are performed by using the touchscreen and some manually operated circuit breakers and switches.

The touchscreen lists all steps required for each manual procedure. This section lists step-by-step controls to operate and conditions to observe in the following manual procedures:

- **Startup**—including initial startup, recovering from input power failure, recovering from battery shutdown and recovering from shutdowns for emergencies or maintenance.
- **Load Transfers**—including transfers from UPS to bypass and retransfers from bypass to the UPS system.
- **Maintenance Bypass Load Transfers**—including transferring from internal bypass to maintenance bypass and transferring from maintenance bypass to internal bypass.
- **Shutdowns**—including module shutdowns for maintenance and emergency shutdowns.



#### NOTE

*The following procedure assumes that the UPS installation inspection and initial startup have been performed by Liebert Services. A Liebert-authorized representative must perform the initial system startup to ensure proper system operation.*

## 2.4.1 Startup Procedure



### CAUTION

The following procedure provides power to the critical load distribution system. Verify that the critical load distribution is ready to accept power. Make sure that personnel and equipment are ready for the critical load distribution system to be energized.

If your installation includes a Maintenance Bypass, you may already be supplying power to the critical load equipment through the Maintenance Bypass. If there is no power to the critical load, apply power through the UPS bypass line per the following procedure.

During startup, power is supplied to the critical load through the UPS (internal) bypass line while the UPS system is being energized. Depending on the reason for the UPS system shutdown, power may be present in the bypass line. To determine this, check the Monitor/Mimic Display screen after control power is available.

1. Before you apply power to the UPS modules, determine the position of the following circuit breakers and switches:
  - Input Circuit Breaker (CB1)—Verify that this breaker on the front of the UPS cabinet (**Figure 2**) is in the Open position.
  - Module Battery Disconnect (MBD)—Verify that this external breaker is open or tripped. If battery cabinets are used, verify that breakers on all the cabinets are open.
  - Bypass Circuit Breaker (BFB)—This circuit breaker (**Figure 2**) should be open.



### NOTE

*Power to the critical load may already be supplied through this breaker.*

- Output Circuit Breaker (CB2)—This motorized circuit breaker (**Figure 2**) should be open.



### NOTE

*If the system was shut down in response to an “Emergency Off”, there may be alarm messages on the touchscreen that describe system conditions before (or at the time of) the shutdown. Some or all of the alarm conditions may have been resolved. To clear these alarm messages, turn off control power (see **Figure 2**). Wait at least 10 minutes for the control power circuitry to completely de-energize. After 10 minutes, turn control power back on and wait two minutes before continuing.*



### WARNING

Risk of electrical shock and high short circuit current. Can cause equipment damage, personal injury and death.

If the UPS has been shut down for maintenance, verify that all of the UPS system doors are closed and latched. All test equipment must be removed from the system. All electrical connections must be secure.

2. Power must be provided to the UPS controls so the operator can use the display touchscreen and so the system logic can function properly. The display touchscreen may be used to monitor UPS system status, even when the UPS modules are not operating. This will be the usual condition unless you are recovering from a maintenance shutdown.
3. If the bypass line is not supplying the load, energize the bypass line by:
  - a. Closing the Bypass Input Breaker (BIB), external to the UPS. This breaker may be in the Maintenance Bypass Cabinet.  
The display touchscreen should start up.
  - b. Pressing the “Start-Up” then “Manual Start” menu buttons (see **Figure 30**).
  - c. The “Close BFB” message appears in the multipurpose window. Close the BFB breaker (see **Figure 2**).
  - d. A “Press OK to issue BPSS On Command” message appears. Press OK to continue.  
This will energize the load on the UPS internal bypass.

- e. The “Close CB1” message will appear. Close CB1 (see **Figure 2**)
- f. The “Press OK to Issue Rectifier On Command” message will appear. Press “OK”  
This will start the UPS’ rectifier. Load is still on internal bypass.
- g. The “Press OK to Issue Inverter On Command” message appears. Press “OK”  
The motorized Module Output Breaker (CB2) will close. The rectifier will be On and the Inverter will be on standby. Load is still on internal bypass.
- h. The “Press OK to Issue Transfer Command” message appears. Press “OK”  
The load is now energized from the UPS Inverter.

## NOTICE

Risk of equipment damage. If any abnormal situation occurs during this startup procedure, open the input circuit breaker and investigate the problem. Call Liebert Services if help is required.

4. When the Module DC Bus voltage is at 100%, you can manually close the module battery disconnect (MBD) circuit breaker (external to the UPS).

The Battery block in the Monitor/Mimic Display indicates the battery voltage and charge current.



### NOTE

The battery charge current may increase quickly, but then should slowly decrease. If the system is recovering from a battery shutdown or an input power failure, the UPS rectifier will be recharging the battery. Recharge current can be more than 100 Amps. The maximum allowable recharge current for your unit will depend on the kVA rating and your factory-set battery recharge current limit.

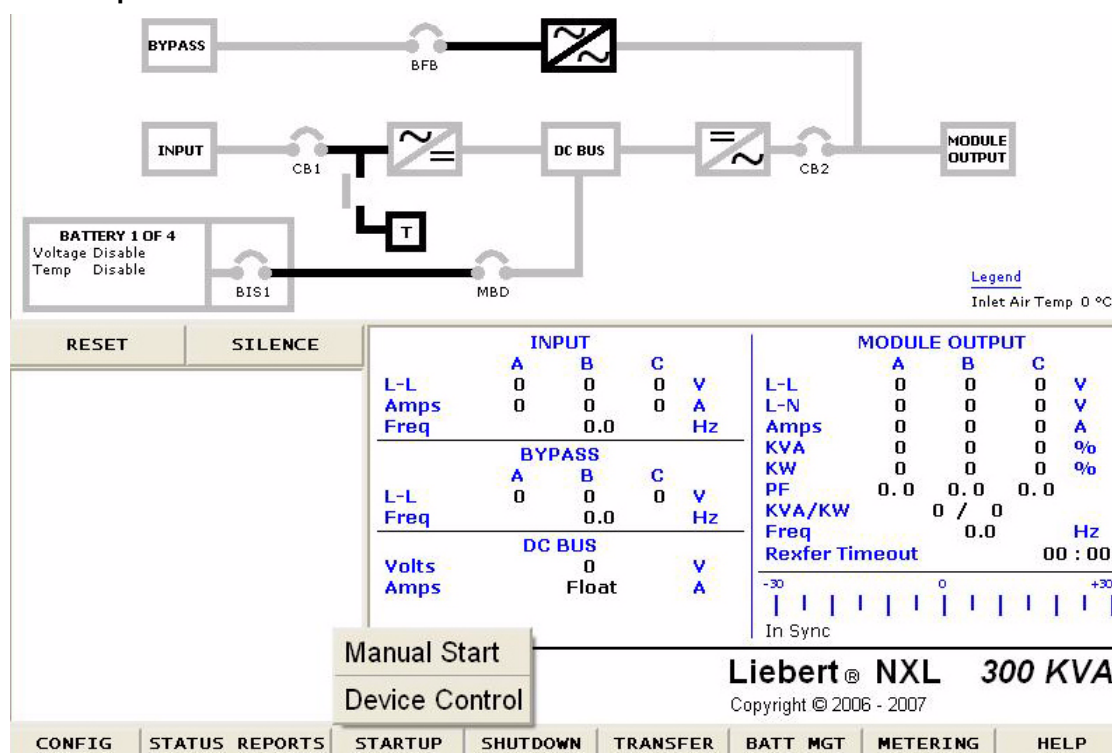


## WARNING

Risk of electric shock, explosive reaction, hazardous chemicals and fire. Can cause equipment damage, personal injury and death.

Do not use equalize charging with valve-regulated, lead-acid batteries. Refer to the battery manufacturer’s manual, available on the manufacturer’s Web site, for specific information about equalize charging.

**Figure 30 Startup commands**



## 2.4.2 Load Transfer Procedures

Changing the load from the UPS system to the UPS bypass is called a transfer. Changing the load from UPS bypass to the UPS system is called a retransfer. Note that the UPS system control logic can initiate automatic load transfers and retransfers. Refer to **2.6 - Automatic Operations**.

### Transfer Procedure

1. Press the “Transfer” menu button on the touchscreen.
2. The Transfer/Retransfer screen will appear in the multipurpose window (see **Figure 18**).
3. If the UPS output is with synchronization with the bypass, press the “Bypass” button. This will transfer the load from UPS to Bypass.

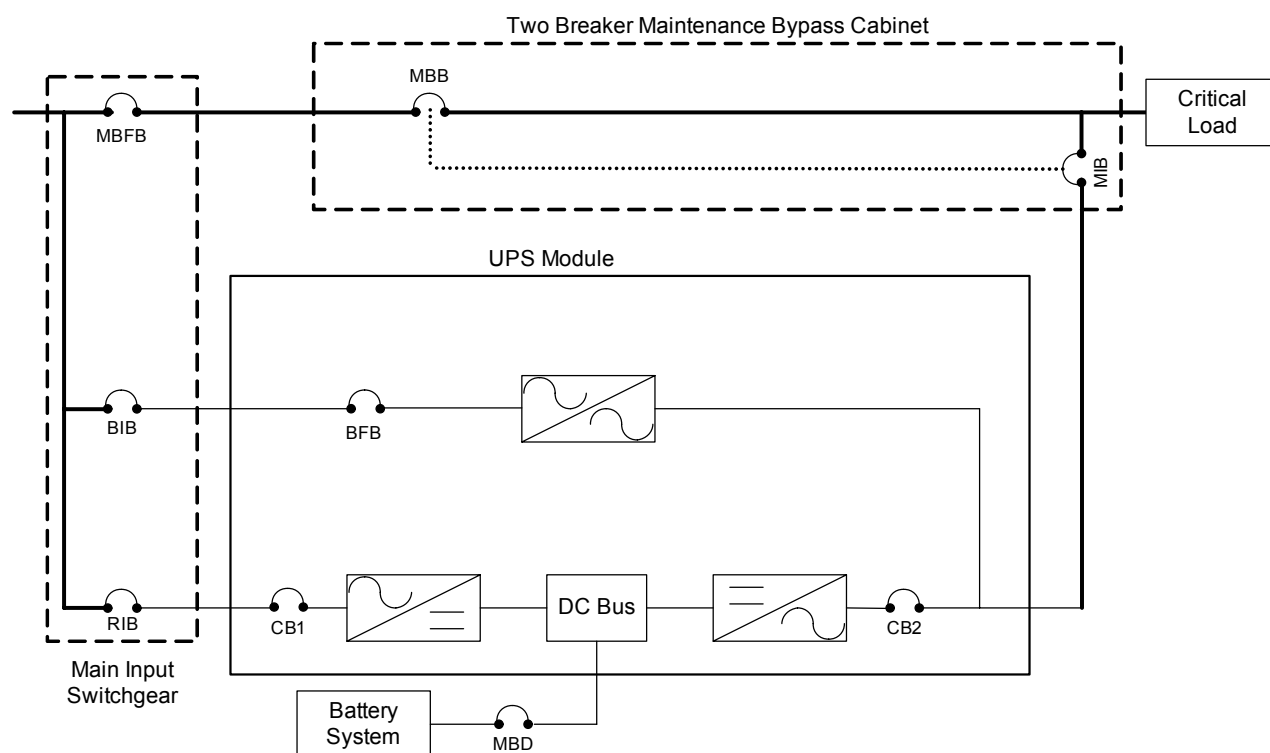
### Re-Transfer Procedure

1. Press the “Transfer” menu button on the touchscreen.
2. The Transfer/Retransfer screen will appear in the multipurpose window (see **Figure 18**).
3. If the UPS output is with synchronization with the bypass, press the “UPS” button. This will transfer the load from Bypass to UPS.

## 2.4.3 Maintenance Bypass Load Transfers

To manually transfer the load between Maintenance Bypass and the UPS bypass line, carefully follow these instructions. Do not transfer the load between Maintenance Bypass and the UPS module (inverter) output. Use the Monitor/Mimic Display screen to verify the UPS bypass line is available.

**Figure 31 UPS with two-breaker bypass cabinet**



## NOTICE

Risk of equipment damage. Failing to follow the proper operating sequence when operating any circuit breaker may cause damage to the connected equipment. Operating a Maintenance Bypass circuit breaker out of sequence could cut off power to the critical load.



## NOTICE

Risk of equipment damage. The UPS system must be on internal bypass before performing the following procedures and operating MIB or MBB, or damage to the UPS may occur and the critical load may be lost.

### Maintenance Bypass Load Transfers—If Load is on UPS Bypass

1. If the maintenance bypass cabinet or switchboard has an optional two-key interlock system, press the button on the maintenance bypass cabinet to remove the key from the solenoid.



#### NOTE

*If the maintenance bypass cabinet or switchboard has any other type of custom interlock, follow the specific instructions for that interlock system to remove the key.*

2. If using a key interlock system, insert the key into the lock for the Maintenance Bypass Breaker (MBB) to enable it to be closed.
3. Close the Maintenance Bypass Breaker (MBB).
4. Open the Maintenance Isolation Breaker (MIB). The UPS system is now isolated from the critical load, and the load is now on Maintenance Bypass.
5. If using a key interlock system, remove the key from the lock for the Maintenance Isolation Breaker (MIB) to lock it open.
6. If the maintenance bypass cabinet or switchboard has an optional 2-key interlock system, replace the key into the solenoid.
7. If UPS bypass shutdown is required, open the Bypass Input Breaker (BIB).

### Maintenance Bypass Load Transfers—If Load is on Maintenance Bypass

1. Close the Bypass Input Breaker (BIB) or verify BIB is closed. Note that UPS Bypass circuit breaker (motorized) must also be closed. Refer to **2.4.1 - Startup Procedure**.
2. If the maintenance bypass cabinet or switchboard has an optional two-key interlock system, press the button on the maintenance bypass cabinet to remove the key from the solenoid.



#### NOTE

*If the maintenance bypass cabinet or switchboard has any other type of custom interlock, follow the specific instructions for that interlock system to remove the key.*

3. If using a key interlock system, insert the key into the lock for the Maintenance Isolation Breaker (MIB) to enable it to be closed.
4. Close the Maintenance Isolation Breaker (MIB).
5. Open the Maintenance Bypass Breaker (MBB). Load is now on UPS Internal Bypass.
6. If using a key interlock system, remove the key from the lock for the Maintenance Bypass Breaker (MBB) to lock it open.
7. If the maintenance bypass cabinet or switchboard has an optional 2-key interlock system, replace the key into the solenoid.

## 2.5 Shutdown Procedures

### 2.5.1 Module Shutdown Procedure

Perform a Module Shutdown Procedure when you want to remove power from a UPS module.

Read all warnings in **3.0 - Maintenance** before performing any maintenance on your Liebert NXL UPS. These warnings and cautions must be observed during any work on the UPS.



#### NOTE

*Service and maintenance work must be performed only by properly trained and qualified personnel and in accordance with applicable regulations as well as with manufacturers' specifications.*

Use the module Monitor/Mimic Display to determine the operating condition of the UPS module.

### UPS Shutdown Procedure



#### NOTE

*This shutdown turns Off the inverter and the rectifier and trips all battery breakers. Transfers to bypass if available*

1. Press the "Shutdown" menu button on the touchscreen.  
The Shutdown screen will appear in the multipurpose window (see **Figure 15**).
2. Press the "UPS" button. This brings up a warning dialog box (see **Figure 16**).
3. Press OK to shut down the UPS

### System Shutdown Procedure



#### NOTE

*This shutdown turns Off the inverter and the rectifier and trips all battery breakers. Will shut down UPS completely.*

1. Press the "Shutdown" menu button on the display touchscreen.  
The Shutdown screen will appear in the multipurpose window (see **Figure 15**).
2. Press the "System" button. This brings up a warning dialog box (see **Figure 17**).
3. Press OK to shut down the system.

## 2.6 Automatic Operations

The Liebert NXL UPS system is designed to function while unattended by an operator. The system control logic monitors the performance of the UPS, the availability of power sources and the current required by the critical load.

The system control logic:

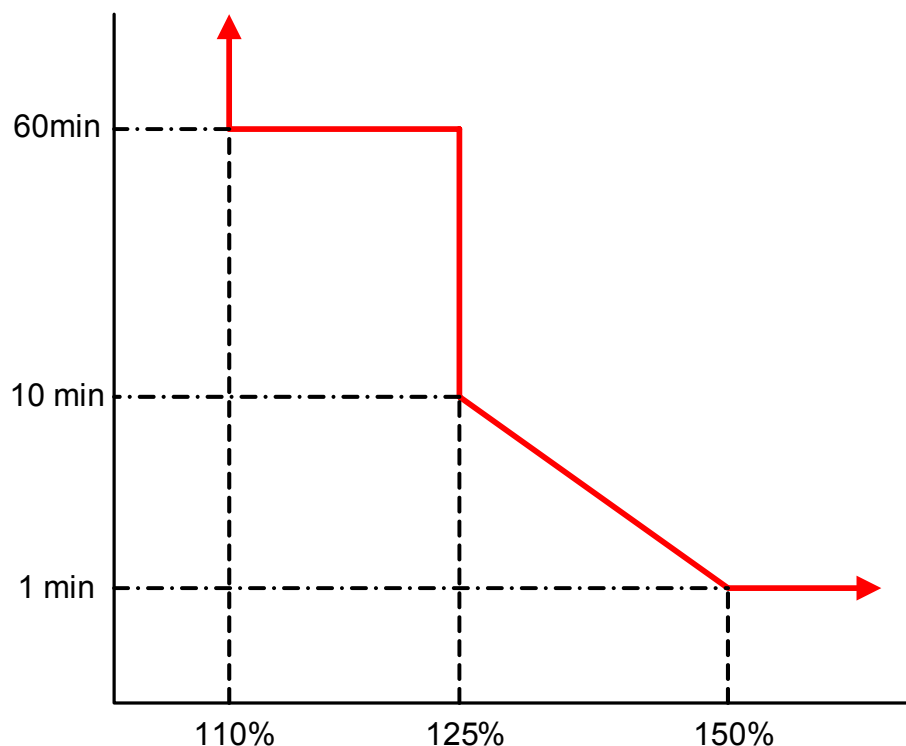
- Determines what overload conditions can be sustained without a transfer to bypass.
- Initiates an automatic transfer to bypass to sustain an overload or when selected UPS faults occur.
- Can initiate an automatic retransfer to the UPS after an overload has been cleared.
- Initiates an automatic transfer to bypass and emergency module shutdown when specified UPS faults occur.

### 2.6.1 Overloads (Without Transfer)

The UPS system is capable of sustaining full output voltage ( $\pm 2\%$  of the nominal voltage) for overload conditions that remain within (under) the current versus time curve of overload capacity (**Figure 32**). Note that the time scale is not linear.

For high current demands of short duration (momentary overloads) the critical load is supplied simultaneously by both the UPS system and the bypass line. Whenever an overload condition occurs, you should determine the cause of the overload. If an overload condition exceeds the overload capacity, the UPS system initiates an automatic load transfer to the bypass line.

Figure 32 Current-versus-time curves of overload capacity



### 2.6.2 Automatic Transfers to Bypass (Overload Condition)

The UPS system will initiate an automatic load transfer to the bypass line if an overload condition exceeds the current-versus-time curve of overload capacity or if specified UPS system faults occur. Load On Bypass is illustrated in **Figure 24**.

The Overload Transfer and Output Undervoltage alarm messages will initiate an automatic transfer to bypass and the Load On Bypass message will be displayed. The active event window will display the Automatic Transfer to Bypass message. Other UPS system faults will initiate an automatic transfer to bypass followed immediately by the shutdown and isolation of the UPS system. Refer to **2.6.3 - Automatic Transfers to Bypass, UPS System Faults**.

In an automatic transfer to bypass the output and bypass circuit breakers do not overlap as they do in a manual transfer. The static bypass switch is fired (closed), the output circuit breaker is opened, and the bypass circuit breaker is closed. Bypass power is supplied to the critical load through the static bypass switch during the short time while both circuit breakers are open.



#### NOTE

*A load transfer to the bypass line will be completed whenever an automatic transfer to bypass is initiated. If the OK to Transfer condition is present, the load transfer will be uninterrupted. If the Static Switch Unable alarm message is present for any reason, the automatic transfer will be interrupted for 40 to 120 milliseconds. Because of the reliability of the UPS components, an interrupted load transfer is a very unlikely occurrence.*

### 2.6.3 Automatic Transfers to Bypass, UPS System Faults

For specified UPS system faults, the control logic will initiate an automatic transfer to bypass followed immediately by a shutdown and isolation of the UPS system. The output, battery (MBD) and input circuit breakers are open. The bypass breaker will be closed if the bypass line is available. Note that the bypass line is usually not available during Low Battery Shutdown. The circuit diagram is the same as illustrated in **Figure 28** for Emergency Module Off.

The following UPS system faults will initiate an automatic transfer to bypass:

- DC Overvoltage Shutdown
- Hardware Shutdown
- Inverter Fault
- Low-Battery Shutdown
- Output Overvoltage
- Overload Shutdown
- Overtemperature Timeout
- Rectifier Fuse Blown
- Reverse Power

Refer to **Table 7** for more information about these alarm messages.



#### NOTE

*A load transfer to the bypass line will be completed whenever an automatic transfer to bypass is initiated and the bypass line is available. If the OK to Transfer condition is present, the load transfer will be uninterrupted. If the Static Switch Unable alarm message is present for any reason, the automatic transfer will be interrupted for 40 to 120 milliseconds. Because of the reliability of the UPS components, an interrupted load transfer is a very unlikely occurrence.*

Some installations may include a Remote Emergency Power Off mode that can be initiated automatically by a contact closure in the critical load equipment. Refer to **2.3.6 - Remote Emergency Power Off**.

### 2.6.4 Automatic Retransfers to UPS

In an automatic retransfer, the two circuit breakers (bypass and inverter output) are both closed simultaneously for a short period of time (overlap).

The following critical bus conditions must be present to initiate an automatic retransfer of the critical load from the bypass source to the UPS inverter:

1. Critical load was initially transferred to the bypass source due to a system overload only. A manual retransfer from bypass is required if the transfer to bypass was caused by any condition other than output overload.
2. Overload has since dropped below 100% of the rated load.
3. Both the Input and the Battery (MBD) circuit breakers have remained closed since the overload transfer.
4. OK to Transfer signal received from the control logic for at least 10 seconds, within 5 minutes of the system overload transfer. A manual retransfer from bypass is required for overloads lasting 5 minutes or more.
5. Cyclic-type overloads, which occur up to five (select range is 0 to 5) times in 60 minutes, are automatically returned to the inverter for each event including the Nth overload.



#### NOTE

*If you do not want the UPS system to initiate any automatic retransfers, this can be set during the initial commissioning or by calling your local Liebert Services representative.*

## 3.0 MAINTENANCE

### 3.1 Safety Precautions

Observe the safety precautions in **Battery Cabinet Precautions** inside the front cover.



#### NOTE

*Service and maintenance work must be performed only by properly trained and qualified personnel and in accordance with applicable regulations as well as with manufacturers' specifications.*

Observe ALL of the WARNINGS below before performing ANY maintenance on the UPS System and associated equipment. Also observe the manufacturer's safety precautions pertaining to the battery, along with the battery safety precautions in this section.



#### WARNING

Risk of electrical shock and high short circuit current. Can cause equipment damage, personal injury and death.

Extreme caution is required when performing maintenance.

Be constantly aware that the UPS system contains high DC as well as AC voltages. With input power off and the battery disconnected, high voltage at filter capacitors and power circuits should be discharged within 30 seconds. However, if a power circuit failure has occurred, you should assume that high voltage may still exist after shutdown. Check with a voltmeter before making contact.

AC voltage will remain on the bypass and output circuit breakers and the static bypass switch, unless associated external circuit breakers are opened.

Check for voltage with both AC and DC voltmeters prior to making contact.

When the UPS system is under power, both the operator and any test equipment must be isolated from direct contact with earth ground and the UPS chassis frame by using rubber mats.

Some components within the cabinets are not connected to chassis ground.

Any contact between floating circuits and the chassis is a lethal shock hazard. Use differential oscilloscopes when measuring a floating circuit.

Exercise caution that the test instrument exterior does not make contact, either physically or electrically, with earth ground.

In case of fire involving electrical equipment, use only carbon dioxide fire extinguishers or others approved for use in fighting electrical fires.



#### WARNING

Risk of electrical shock and high short circuit current. Can cause equipment damage, personal injury and death.

Always identify connecting wiring prior to disconnecting any wiring.

Do not substitute parts except as authorized by Liebert Corporation.

Maintain the UPS cabinets free of foreign materials such as solder, wire cuttings, etc.

Contact Liebert Services if you are not sure of the procedures to follow or if you are not familiar with the circuitry.

## 3.2 Liebert Services

Startup, UPS maintenance, battery maintenance and training programs are available for the Liebert NXL UPS through your Liebert sales representative.

### 3.2.1 Professional Startup

**UPS Startup**—Liebert's Customer Engineers perform a thorough non-powered inspection of the units and will then conduct a complete electrical checkout. The battery installation is also inspected and placed on an initialization charge to ensure cell equalization. Customer Operation training will be conducted during battery charge time.

Load bank testing and full site acceptance testing are additional services that can be performed during a UPS startup. One preventive maintenance service call can be added to the initial UPS startup agreement.

**Battery Installation/Startup**—When purchased with a UPS Start-Up, this Agreement provides consistent, professional service for your entire UPS system. This one-source approach avoids conflicts that may occur during a multisource installation. Note that Liebert requires a mandatory installation inspection for all batteries not installed by Liebert Customer Engineers.

**Battery IEEE Certification Inspection** - The Battery Specialist will perform a detailed inspection of the entire battery system to ensure it meets current IEEE standards.

### Maintenance Agreements: The Signature Program

**UPS Service Agreements**—Liebert Services (LGS) has a variety of available maintenance agreements, depending on specific site needs. Choose the level of support appropriate for each installation.

Mission-critical sites can have the standard parts-and-labor, around-the-clock coverage for their UPS, with or without scheduled preventive maintenance visits. Other sites can benefit from a variety of money-saving options.

Liebert recommends two preventive maintenance visits per year for the UPS. The first can be conducted with the UPS operational and includes an infrared scan of key UPS components.

The annual visit will require taking the UPS off-line for a thorough non-powered inspection.

These visits are in addition to the general housekeeping tasks (changing air filters, etc.) that can be performed by customer personnel.

**Battery Service Agreements**—The same flexible Signature Program can also be applied to contracts for battery maintenance. Again, the coverage needed will depend on the type of battery purchased and the degree of support required from Liebert Services.

### Training

Customer training courses include the proper operation of the system, emergency procedures, preventive maintenance and some corrective maintenance.

### Warranties

Contact Liebert Services if you have any questions regarding the warranty on your Liebert NXL UPS or the batteries.

## 3.3 Routine Maintenance

You should become thoroughly familiar with the equipment, but at no time should you go beyond the specific procedures in this manual while performing maintenance or correcting a malfunction.

If you have any doubt as to what must be done, call Liebert Services at 1-800-LIEBERT for further instructions.



### NOTE

*Service and maintenance work must be performed only by properly trained and qualified personnel and in accordance with applicable regulations as well as with manufacturers' specifications.*

The UPS is designed for unattended operation, but does require some common-sense maintenance.

- **Keep good records**—Troubleshooting is easier if you have historical background.
- **Keep it clean**—Maintain the UPS free of dust and any moisture.
- **Keep it cool**—Battery systems must be kept in the range of 72-77°F (22-26°C) in order to meet design specifications for capacity and longevity.

The UPS will reliably meet all performance specifications and design life at temperatures up to 104°F (40°C) and can be slightly derated for operation at even higher temperatures or higher altitudes. However, performance and longevity will be optimized when the UPS is operated at the same temperature as the batteries. Contact your local Liebert sales representative or call 1-800-LIEBERT for further details.

- **Keep connections tight**—Tighten all connections at installation and at least annually thereafter. (See torque requirements, **Table 4**.)
- **Keep it inspected**—Periodically inspect external upstream and downstream circuit breakers to assure that the trip current settings are correct.

Become familiar with typical ambient conditions surrounding equipment so that abnormal conditions may be more quickly recognized. Know what typical meter readings are and where adjustable settings should be.

### 3.3.1 Record Log

Set up a maintenance log to record scheduled checks and any abnormal conditions.

The log should have space for all metered parameter indications including phase readings, alarm messages, UPS mode of operation, air filter replacement date and observation notes. A second log should be maintained for the battery module as directed by the battery manufacturer.

A periodic walk-through inspection of the UPS and battery rooms is advised to check for visible and audible indications of problems. Log the inspection, metered parameter indications and any discrepancies.

### 3.3.2 Air Filters

The air filters must be inspected and serviced on a regular schedule. The period between inspections will depend upon environmental conditions. Under normal conditions, the air filters will require cleaning or replacement approximately every two months. Abnormal or dusty conditions will require more-frequent cleaning and replacement of air filters. Inspect installations in new buildings more often, then extend the inspection period as experience dictates.

All NXL models have a replaceable air filter located inside the front doors. These filters can be changed while the UPS is in operation.

### 3.3.3 Limited Life Components

The Liebert NXL UPS has a design life well in excess of 10 years. Well-maintained units can continue to provide economic benefits for 20 years or more. Long-life components are used in the UPS wherever practical and cost-effective. However, due to the currently available component material, manufacturing technology limitations and the general function and use of the component, a few components in your Liebert UPS will have a shorter life cycle and require replacement in less than 10 years.

The following components utilized in your UPS system have a limited life cycle and are specifically exempt from warranty. To prevent a wear-out failure of one of these components affecting your critical load operations, Liebert recommends these components be periodically inspected and replaced before the expected expiration of their life cycle. The expected life of each component listed below is simply an estimate and is not a guarantee. Individual users may have site-specific requirements, maintenance and other environmental conditions that affect the length of the component's useful life cycle.

**Table 1     UPS component service life**

Component	Expected Life	Replace in:
Power AC filter capacitors	> 7 years (~62,000 hours)	5 to 6 years
Power DC filter capacitors	> 7 years (~62,000 hours)	5 to 6 years
Low-profile fans	> 7 years (~62,000 hours)	5 to 6 years
Air filters	1 to 3 years	Check four times per year
Battery, lithium logic memory backup	10 years (~87,600 hours)	8 to 9 years
Battery, storage		
Lead-acid wet-cell (user selection)	10 to 20 years	1 to 2 years before end-of-life
Valve-regulated, lead-acid (VRLA)	5 years	3 to 4 years
	10 years	6 to 8 years

In most cases, replacement components must exactly match the original component specifications. These replacement components are not readily available from third-party component distributors. For assistance with your specific component specifications, replacement component selection and sourcing, call 1-800-LIEBERT. For customers using Liebert Services' preventive maintenance services, periodic inspection of these components is part of this service, as well as recommending component replacement intervals to customers to avoid unanticipated interruptions in critical load operations.

## 3.4 Battery Maintenance



### WARNING

Risk of electrical shock and high short circuit current. Can cause equipment damage, personal injury and death.

These maintenance procedures will expose hazardous live parts. Refer servicing to properly trained and qualified personnel working in accordance with applicable regulations as well as with manufacturers' specifications.

DC fuses operate at the rated battery voltage at all times. A blown DC bus fuse indicates a serious problem. Serious injury or damage to the equipment can result if the fuse is replaced without knowing why it failed. Contact Liebert Services for assistance.



### 3.4.1 Battery Safety Precautions

Servicing of batteries should be performed or supervised by personnel knowledgeable of batteries and the required precautions. Keep unauthorized personnel away from batteries.

When replacing batteries, use the same number and type of batteries.



#### **WARNING**

Risk of electric shock, explosive reaction, hazardous chemicals and fire. Can cause equipment damage, personal injury and death.

Lead-acid batteries contain hazardous materials. Batteries must be handled, transported and recycled or discarded in accordance with federal, state and local regulations. Because lead is a toxic substance, lead-acid batteries must be recycled rather than discarded.

Do not dispose of battery or batteries in a fire. The battery may explode.

Do not open or mutilate the battery or batteries. Released electrolyte is harmful to the skin and eyes. It is toxic.



#### **WARNING**

Risk of electrical shock and high short circuit current. Can cause equipment damage, personal injury and death.

The following precautions must be observed when working on batteries:

- Remove watches, rings and other metal objects.
- Use tools with insulated handles.
- Wear rubber gloves and boots.
- Do not lay tools or metal parts on top of batteries.
- Disconnect charging source prior to connecting or disconnecting battery terminals.
- Determine whether the battery is grounded. If it is grounded, remove source of ground. Contact with any part of a grounded battery can result in electrical shock. The likelihood of such shock will be reduced if such grounds are removed during installation and maintenance.

Lead-acid batteries can present a risk of fire because they generate hydrogen gas. In addition, the electrical connections must be protected against accidental short circuits which can cause sparks. The following procedures should be followed:

- DO NOT SMOKE when near batteries.
- DO NOT cause flame or spark in battery area.
- Discharge static electricity from body before touching batteries by first touching a grounded metal surface.
- After replacing battery jars in a battery cabinet, replace the retaining straps that hold the jars in place on the shelves. This will limit accidental movement of the jars and connectors should the cabinet ever need to be repositioned or relocated.

Regular maintenance of the battery module is an absolute necessity. Periodic inspections of battery and terminal voltages, specific gravity and connection resistance should be made. Strictly follow the procedures outlined in the battery manufacturer's manual, available on the manufacturer's Web site.

Valve-regulated lead-acid (sealed-cell) batteries do require periodic maintenance. Although maintenance of electrolyte levels is not required, visual inspections and checks of battery voltage and connection resistance should be made.

#### **NOTICE**

Risk of equipment damage. Batteries should be cleaned with a dry cloth or a cloth lightly moistened with water. Do not use cleaners on the batteries. Solvents can make the battery cases brittle.

Because individual battery characteristics are not identical and may change over time, the UPS module is equipped with circuitry to equalize battery cell voltages. This circuit increases charging voltage to maintain flooded type battery cells at full capacity.



## WARNING

Risk of electric shock, explosive reaction, hazardous chemicals and fire. Can cause equipment damage, personal injury and death.

Do not use equalize charging with valve-regulated, lead-acid batteries. Refer to the battery manufacturer's manual, available on the manufacturer's Web site, for specific information about equalize charging.

### Matching Battery Cabinets—Optional

Although the individual battery cells are sealed (valve-regulated) and require only minimal maintenance, the Battery Cabinets should be given a periodic inspection and electrical check. Checks should be performed at least annually to ensure years of trouble-free service.

**Voltage Records:** With the Battery Cabinet DC circuit breaker closed and the connected UPS operating, measure and record battery float voltage. With the DC circuit breaker open, measure and record the nominal (open circuit) voltage. Both these measurements should be made across the final positive and negative terminal lugs. Compare these values with those shown below. The recorded nominal voltage should be no less than the value shown; while the recorded float voltage should be within the range shown. If a discrepancy is found, contact Liebert Services.

**Table 2 Battery voltage, nominal and float**

Number of Cells	Battery Voltage, VDC	
	Nominal	Float
240	480	527 - 552

**Power Connections:** Check for corrosion and connection integrity. Visually inspect wiring for discolored or cracked insulation. Clean and/or retighten as required. Refer to torque specifications in **Table 4**.

**Battery Cell Terminals:** Check for discoloration, corrosion and connection integrity. Clean and tighten if necessary. Note that when installing a new battery, the initial torque value is 5 lb.-in. more than the retorquer value. **Table 8** shows battery retorquer values.

**Table 3 Battery retorquer values**

Battery Manufacturer	Battery Model Number	Retorque Value
C&D batteries	UPS12-300MR	110 in-lb
	UPS12-350MR	110 in-lb
	UPS12-400MR	110 in-lb
	UPS12-490MR	110 in-lb
	UPS12-540MR	110 in-lb
Energysys	HX205-FR	65 in-lb
	HX300-FR	65 in-lb
	HX330-FR	65 in-lb
	HX400-FR	65 in-lb
	HX500-FR	65 in-lb

If you have a different model battery, contact Liebert Services for the required torque value.

To access battery cell terminals, disconnect the inter-tier cable and two shelf retaining screws. Once disconnected, insulate (with protective boot or electrical tape) the cables to prevent accidental shorts. The battery shelf can now be pulled out. Tighten each terminal connection to the retorquer value. When replacing a battery, the terminal connections must be cleaned and tightened. Disconnect and insulate the cables connected to the battery. Secure each battery shelf with retaining screws when maintenance is complete.

## Rack-Mounted Batteries

If the UPS system uses a battery other than a factory-supplied Matching Battery Cabinet, perform maintenance on the battery as recommended in the battery manufacturer's maintenance manual, available on the manufacturer's Web site.

### 3.4.2 Torque Requirements

All electrical connections must be tight. **Table 4** provides the torque values for the connections in the UPS. Use these values unless the equipment is labeled otherwise.



#### NOTE

*Refer to the battery manufacturer's manual, available on the manufacturer's Web site, for the proper torque values required for the battery.*

**Table 4** Torque specifications, unless otherwise labeled

Nut and Bolt Combinations		
Bolt Shaft Size	Grade 2 Standard lb-in (Nm)	Electrical Connections with Belleville Washers lb-in (Nm)
1/4	53 (6.0)	46 (5.2)
5/16	107 (12)	60 (6.8)
3/8	192 (22)	95 (11)
1/2	428 (48)	256 (29)
Circuit Breakers with Compression Lugs (For Power Wiring)		
Current Rating	lb-in (N-m)	—
400 - 1200 Amps	300 (34)	—
Circuit Breakers with Compression Lugs (For Control Wiring)		
AWG Wire Size or Range	lb-in (N-m)	—
#22 - #14	3.5 to 5.3 (0.4 to 0.6)	—

## 3.5 Detecting Trouble

It is important that the operator check the instrument readings if abnormal equipment performance is suspected. Any metered value that differs appreciably from normal could mean an impending malfunction and should be investigated.

#### Items to check include:

- If the UPS has not operated on battery power during the last 10 hours, the batteries should require little charging current. Battery mimic should indicate normal DC voltage with the battery charge current no more than 1% of maximum discharge current.
- Input current on each phase should be within 10% of the average input current.
- Alarm messages indicate malfunction or impending malfunction. A daily check of the Display Screen will help to provide an early detection of problems. Refer to **Table 7** for information about interpreting alarm messages.
- Tracing a problem to a particular section is facilitated by alarm messages and the metered parameter indications.

## NOTICE

If the UPS system has an open fuse, the cause should be determined before replacing the fuse. Contact Liebert Services for assistance.

### 3.6 Reporting a Problem

If a problem occurs within the UPS, review all alarm messages along with other pertinent data. Contact Liebert Services at 1-800-LIEBERT to report a problem or to request assistance.

### 3.7 Corrective Actions

For each alarm message on the Display Screen, you can find the recommended corrective action in Table 7.

### 3.8 Upstream Feeder Circuit Breaker Setting Inspections

During normal UPS operations, short-term overload current demand from the bypass source may reach 10 times the UPS output current rating. This overload current demand may be caused by the magnetizing inrush current of one or more downstream transformers (i.e., power distribution units) or faults on downstream branch circuits. The instantaneous trip point(s) of the upstream bypass feeder breaker(s) must be set to support these temporary overloads. The magnitude of short-term overload bypass current demand is typically six to eight times the UPS current rating, but must be determined by analysis on a per-site basis. This analysis, generally known as an End-to-End Fault Coordination Study, must be done by a registered professional engineer experienced in this activity and familiar with local codes and related requirements.

Liebert strongly recommends periodic inspections of the bypass feeder breaker instantaneous trip settings, as well as the module input (rectifier) feeder breaker trip settings, to ensure that they are correct. For a variety of reasons, although typically during circuit breaker maintenance procedures by others, trip settings have been known to be inadvertently left improperly set. Correct trip setting of these circuit breakers is most important to achieving high-availability from your Liebert UPS system. For further information regarding proper trip settings for your feeder breakers, call 1-800-LIEBERT.



#### NOTE

*The instantaneous trip setting of the breaker feeding the UPS bypass input should be high enough to accommodate short-duration overloads. The bypass static switch power path inside the UPS can draw up to 10 times the system's rated current for up to three cycles.*



#### NOTE

*While Liebert can provide typical guidelines, the responsibility for the proper breaker trip settings outside the Liebert-manufactured UPS equipment resides with the owner. Contact Liebert Services at 1-800-LIEBERT for further details.*

## 4.0 SPECIFICATIONS

### 4.1 Battery Operation

The separate battery manufacturer's manual, available on the manufacturer's Web site, provides the necessary information for the installation, operation and maintenance of the battery. Use the battery manual in conjunction with this manual.

The float charge voltage for a battery is equal to the number of cells in series making up the battery multiplied by the charge voltage for each cell.

Because the charging voltage level is critical to proper battery operation, refer to your battery manual, available on the manufacturer's Web site, for information about your system.

For models with nominal 240-cell battery, the DC bus nominal float voltage range is 527 to 561VDC. Maximum equalize voltage is 585VDC. Battery voltage at end of discharge is 386VDC at the UPS terminals (389VDC at the battery). The number of battery cells required will range from 236 to 244, depending on the application.

### 4.2 Environmental Conditions

**Table 5 Environmental specifications**

Parameter	Specification
Enclosure	The UPS is housed in a NEMA-1 enclosure. The enclosure is designed for indoor use only and is not to be subjected to falling objects or precipitation.
Recommended Operating Temperature, °F (°C)	77 (25) ambient
Maximum Operating Temperature, °F (°C)	104 (40) ambient (design temperature) without derating; (see Notes 2 and 3).
Minimum Operating Temperature, °F (°C)	0°C
Storage Temperature, °F (°C)	-13 to 158 (-25 to 70)
Typical Battery Temperature Requirements	Average annual temperature must not exceed 80°F (27°C). Peak temperature must not exceed 109°F (43°C). See battery manufacturer's recommendations.
Relative Humidity	0 to 95% without condensation
Operating Elevation	Sea level to 4900 ft. (1500m) without derating
Storage Elevation	Sea level to 50,000 ft. (15,240m)
Audible Noise, 5 Feet (1.5m) from Unit	68 dBA typical

#### Notes on Environmental Specifications

1. This category of electronic equipment is agency rated for use in an atmosphere free of conductive particles. Some industrial facilities may require a room air filtration system to keep the UPS free of excess moisture and contaminants.
2. The UPS system is designed to operate continuously at 104°F (40°C). However, design equipment life expectancy will be extended with lower temperatures (25°C is recommended).
3. Ambient temperature is the maximum ambient temperature during any 24-hour period. For operation at higher temperatures, consult your Liebert sales representative or call Liebert Services at 1-800-LIEBERT.
4. Exercise care during installation to ensure unimpeded airflow through the UPS.
5. For operation at higher elevations, consult your Liebert sales representative or call Liebert Services at 1-800-LIEBERT.

**Table 6 Electrical specifications**

Liebert NXL Model Size	250	300	400
Input Parameters			
Input Voltage to Rectifier, VAC	480V 3-phase, 3-wire		
Input Voltage to Bypass, VAC	480V 3-phase, 3- or 4-wire		
Permissible Input Voltage Range, VAC	70% to 110%		
Input Frequency, Hz	60		
Permissible Input Frequency Range, Hz	55 to 65		
Input THDi at nominal voltage at full load, %	<10% with 6-pulse and passive filter		
Input Power Factor at nominal voltage	>= 0.92		
Flexi Power Walk-In, sec	3 to 30 (selectable) in 1 sec. Increments		
Battery & DC Parameters			
Battery Type	VRLA (Valve Regulated Lead Acid) or FLA (Flooded Lead Acid)		
Nominal Battery Bus, VDC	480V		
Battery Float Voltage, VDC	540V		
End-Cell Voltage, VDC	384 (for VRLA / FLA)		
DC Ripple Voltage in float & Const V Ch.mode, %	<1 (RMS value) < 3.4% Vpp		
Temperature Compensated Battery Charging	Standard (with temperature probe)		
Output Parameters			
Inverter Type	IGBT-based Sine-Sine PWM Controlled		
Output Power, kW	225	270	360
Output Voltage	480VAC, 3-ph, 4-w		
Output Voltage Regulation, %	< 1% (3-phase RMS average)		
Output Voltage Regulation (100% Unb. Load)	< 2% (3-phase RMS average)		
Output Frequency, Hz	60		
Output Frequency Regulation, %	± 0.1		
Output THDu at Nominal Voltage (Linear Load), %	<2%		
Output THDu at nominal voltage Including a 100kVA Non Linear Load per EN 62040-3, %	2.5% (max)		
Capacity to Handle Step Load, %	0-100 or 100-0		
Transient Recovery (Linear Loads), %, msec	within 5% peak to peak in one-line cycle		
Capacity to Handle Leading PF Load	Up to 0.8 with the following ratings:		
a - 0.5 lag to 0.9 lag	a - Subject to maximum kVA rating		
b - 0.9 lag to Nom	b - Subject to maximum kW rating		
c - at 0.95 Lead	c - Subject to maximum. kW rating		
d - at 0.9 Lead	d - Subject to 12,5% kW derate or same rating and 10°C temp. derate		
e - at 0.8 Lead	e - Subject to 25% kW derate or 12,5% kW derate and 10°C Temp. Derate		
Voltage Displacement, ° el	120° ±1° el (with 100% unbalanced load)		
Compliance to FCC Class-A	Standard		
Overload Conditions, % FL	110% for 60 minutes		
	125% for 10 minutes		
	150% for 1 minute		

**Table 6 Electrical specifications (continued)**

Liebert NXL Model Size	250	300	400
<b>System Parameter</b>			
UPS Efficiency AC-AC 100% Load, %	93.9%	94%	94.2%
UPS Efficiency AC-AC 50% Load, %	93.2%	93.3%	93.4%
<b>Physical Parameters &amp; Standards, in (mm)</b>			
Width	71.8 (1823)	78.5(1993)	78.5(1993)
Depth	33.5 (850)	33.5 (850)	39.4 (1000)
Height	76.8 (1950)		
Weight, lb (kg) approx.	4165 (1889)	4890 (2218)	5450 (2472)
Color	Charcoal (ZP-0420)		
Front Door Opening (for serviceability)	More than 180°		
Degree of Protection for UPS Enclosure	IP 20 (with and without front door open)		
Standards & Conformities	UL 1778 CSA 22.2 107.3 FCC Part 15, Class A IEC62040-2, Level 4, Criteria A EN61000-4-3, Level 3, Criteria A EN61000-4-6, Level 4, Criteria A EN61000-2-2, Criteria A EN61000-4-4, Level 4, Criteria A ANSI C62.41, Category A3 &B3 ISTA Procedure 1H WEEE		





## APPENDIX A - UPS ALARM AND STATUS MESSAGES

**Table 7** shows alarm and status messages as they appear in Liebert NXL's touchscreen and in the history log, along with a description and recommended actions, if any.

If the recommended action fails to correct the condition, contact your factory-authorized service provider.

The "Service Telephone Number" can be found by pressing "CONFIG," "Ratings," "More>>" on the menu bar.

**Table 7 Liebert NXL alarm and status messages**

Event Message	Event Definition	Recommended Action
Auto Restart Fail	An Automatic Restart was enabled but has failed to complete. With Automatic Restart enabled, the unit automatically restarts after an End of Discharge (EOD) event. This alarm means that one of the auto restart requirements was true, but failed before the restart sequence completed. For example, one conditional requirement for Automatic Restart to occur is that the Rectifier Input Voltage must be within acceptable limits. If, during the restart sequence, the input voltage drops out of tolerance, the Automatic Restart will fail. This alarm is self-clearing. When the condition is no longer present, the alarm and any control activity tied to the alarm reverts to normal.	Press "SILENCE" to silence the audible alarm. Check the active events to determine the status of the UPS. If "Auto Restart Fail" is the only alarm present, attempt a manual start of the unit by pressing "Startup," "Manual Start," then following the prompts to attempt to place the unit back online. If the manual start fails, or if there are other alarms present that won't clear, contact your factory-authorized service provider.
Auto Rexfer Failed	The condition that caused an automatic transfer to bypass failed to clear within a specified time delay. An example of a recoverable transfer (one which the controls may attempt to recover from automatically) is an overload that exceeded the overload time curve.	Press "SILENCE" to silence the audible alarm. Press "RESET" to attempt to clear active events. This does not clear the "Auto Retransfer Failed" alarm. If all other alarm conditions clear, attempt a manual transfer back to Inverter by pressing "Transfer," "UPS." If the transfer is successful, press "RESET" to clear this alarm from the Active Event Window. If the UPS fails to transfer and the active messages do not explain the reason, contact your factory-authorized service provider.
Batt CB "#" Open	Battery Circuit Breaker "#" is open. This status message is self-clearing. When the condition is no longer present, the message and any control activity tied to the status event reverts to normal. (The Liebert NXL has eight battery circuit breakers.)	Press "SILENCE" to silence the audible alarm. Check the status of Battery Circuit Breaker "#". If it is open, the alarm is normal. If Battery Circuit Breaker "#" is closed, contact your factory-authorized service provider.

Table 7 Liebert NXL alarm and status messages (*continued*)

Event Message	Event Definition	Recommended Action
Batt Discharging	<p>The UPS is on battery.</p> <p>The most common reason for going to battery is a loss of rectifier input power (power outage). This alarm is self-clearing. When the condition is no longer present, the alarm and any control activity tied to the alarm reverts to normal.</p>	<p>Press "SILENCE" to silence the audible alarm. Observe the One-Line Display. If the input line is orange, black, or gray, the battery discharging condition is normal.</p> <p>If the input line on the One-Line Display is green, check the Active Event Window for potential fault conditions that could explain why the UPS is on battery. An example of this could be "Rectifier Fault."</p> <p>Monitor the UPS during the battery discharge. The display shows the discharge curve of the battery. When the Battery Voltage Line touches the End of Discharge Line, the UPS shuts down.</p> <p>Check the bypass line on the One-Line Display. If the line feeding the Static Bypass Switch (BPSS) is green, the unit can be transferred to bypass by pressing "Transfer," "Bypass" to transfer the load to the bypass source. Note that transferring to bypass could expose the load to an outage if the bypass source fails.</p> <p>If the battery is discharging because of a fault such as "Rectifier Fault" in the Active Event Window rather than an actual power outage, transfer to bypass if available, and contact your factory-authorized service provider.</p>
Batt Equalizing	<p>The batteries are being equalized.</p> <p>Battery equalization stops automatically based on the Equalize Time Setting.</p> <p>This status message is self-clearing. When the condition is no longer present, the message and any control activity tied to the status event reverts to normal.</p>	<p>In normal operation, no user response is required. Equalize charge can be terminated at any time by pressing "Battery Management," "Manual Battery Equalize," "Stop."</p>
Batt Ground Fault	<p>Detected battery ground current exceeds the trip setting.</p> <p>A possible symptom that could cause this alarm is a leaking battery.</p> <p>This alarm has a higher detection setpoint than "Battery Ground Fault Current Warning," and if present, means that the Battery Ground Fault Current is excessive.</p> <p>This alarm could cause Battery Breakers to trip if the "Battery Ground Fault Trip Enable" setting is enabled.</p>	<p>Press "SILENCE" to silence the audible alarm.</p> <p>Are any Battery Circuit Breakers tripped?</p> <p>Perform a visual inspection of the batteries in the tripped string(s). Look for signs of leaking battery acid or excessively corroded battery terminals.</p> <p>If there are no visible signs of defective batteries, press "RESET" to try and clear the alarm.</p> <p>Close any open breakers one at a time, pressing "RESET" after each one to see which string is causing the alarm. The string reporting the fault, when online, will not allow the alarm to reset.</p> <p>Once the location is identified, or if the battery string tests are inconclusive, contact your factory-authorized service provider.</p>

**Table 7     Liebert NXL alarm and status messages (continued)**

Event Message	Event Definition	Recommended Action
Batt Ovtemp Limit	<p>One or more of the Battery Temperature Sensors is reporting a temperature above the limit setpoint.</p> <p>There are two user-adjustable Battery Temperature Setpoints: Battery Over Temperature Warning and Battery Overtemperature Limit. The temperature in one or more battery compartments has risen above the limit setpoint.</p> <p>Depending on user settings, the controls may trip the battery breaker associated with the over temperature condition.</p>	<p>Press "SILENCE" to silence the audible alarm. Observe the One-Line Display. To identify which battery cabinet is reporting the temperature condition, press the "Battery Box" on the One-Line Display to cycle through each battery compartment or string. The temperature display is located under the voltage reading in the Battery Box.</p> <p>If the Common Battery Disconnect and/or the individual battery cabinet or string reporting the over temperature condition is tripped, check the following settings.</p> <p>Press "User Settings," "Battery Management," "Battery Temperature" to check the current Battery Temperature Setpoints. If none of the Battery Boxes on the One-Line Display exhibit a temperature in excess of the temperature setpoint in the user settings, contact your factory-authorized service provider.</p> <p>If the overtemperature limit is being reported correctly, investigate potential causes such as faulty air conditioning, or air flow blockage and resolve. Otherwise, contact your factory-authorized service provider.</p>
Batt Ovtemp Warning	<p>One or more of the Battery Temperature Sensors is reporting a temperature above the warning setpoint.</p> <p>There are two user adjustable Battery Temperature Setpoints: Battery Over Temperature Warning and Battery Overtemperature Limit. This alarm means the temperature in one or more battery compartments has risen above the warning setpoint.</p> <p>This alarm is self-clearing. When the condition is no longer present, the alarm and any control activity tied to the alarm reverts to normal</p>	<p>Press "SILENCE" to silence the audible alarm. Observe the One-Line Display. To identify which battery cabinet is reporting the temperature condition, press the "Battery Box" on the One-Line Display to cycle through each battery compartment or string. The temperature display is located under the voltage reading in the Battery Box.</p> <p>Press "User Settings," "Battery Management," "Battery Temperature" to check the current Battery Temperature Setpoints. If none of the Battery Boxes on the One-Line Display exhibit a temperature in excess of the temperature setpoint in the user settings, contact your factory-authorized service provider.</p> <p>If the overtemperature warning is being reported correctly, investigate potential causes, such as faulty air conditioning or air flow blockage and resolve. Otherwise, contact your factory-authorized service provider.</p>
Batt Self Test	<p>The UPS is performing a battery self test. The battery self test terminates automatically at the end of the test.</p> <p>Battery test settings are adjustable and can be accessed by pressing "Config," "User Settings," "Batt Mgt," "Battery Test."</p> <p>This status message is self-clearing. When the condition is no longer present, the message and any control activity tied to the status event reverts to normal.</p>	<p>During normal operation, no user response is required.</p> <p>The battery test can be terminated at any time by the user by pressing "Batt Mgt," "Manual Battery Test," "Stop."</p>
Batt Sensor Fail	<p>The controls are sensing a failed Battery Temperature Sensor.</p> <p>If a sensor reports a value outside the normal operating range of the sensor, it is considered failed.</p> <p>This alarm is self-clearing. When the condition is no longer present, the alarm and any control activity tied to the alarm reverts to normal.</p>	<p>Press "SILENCE" to silence the audible alarm.</p> <p>Try to identify which sensor has failed by observing the temperature reading inside the Battery Box on the One-Line Display. Cycle through all connected batteries by pressing the Battery Box on the display. Contact your factory-authorized service provider.</p>

**Table 7     Liebert NXL alarm and status messages (continued)**

Event Message	Event Definition	Recommended Action
Batt Temp Imbalance	With more than one Battery Temperature Sensor installed, the controls are detecting too great a temperature difference between the individual sensors.	Press "SILENCE" to silence the audible alarm. To attempt to identify which sensor is reporting an inconsistent temperature or an overheating battery, observe the temperature reading inside the Battery Box on the One-Line Display. Cycle through all connected batteries by pressing the Battery Box. If it appears this alarm is due to a specific cabinet or battery string being warmer than the others, verify through investigation whether the string is actually getting warmer than the others, or if the sensor appears to be reporting incorrectly. Contact your factory-authorized service provider.
Batt Test Failed	An Automatic or Manual Battery Test Failed. The battery "Test Duration" is adjustable. The battery test fail criteria were met before the end of the timed battery test. For example, there must be at least 25% load to run the battery test. If, during the battery test the load drops below 25%, the test fails.	Press "SILENCE" to silence the audible alarm. Contact your factory-authorized service provider.
Batt Test Inhibit	The conditions required to perform an automatic battery test are not met. When the battery test is inhibited, the system delays the test for 7 days. If conditions are satisfied after 7 days, the UPS performs the battery test at that time. Examples of conditions required to run the automatic battery test are at least 20% load, all battery breakers closed, normal operation, etc.	Check the Active Event Window and investigate other events to further analyze. If there are other active events in the Active Event Window, press "RESET" to clear the events. Check the One-Line display to verify the UPS is online. Check the Module Output Meter and verify the kW load is between 20%-100%. Press the Battery Box on the One-Line Display and verify all battery strings show at least 90% charged and all battery breakers are closed. If the issue cannot be resolved, contact your factory-authorized service provider.
Batt Test Passed	The Battery Test passed.	None.
BFB Open	The Backfeed Breaker is open. The Backfeed Breaker feeds the Static Bypass Switch (BPSS). The physical location of the breaker depends on unit configuration. It may be located in the UPS, or it may be located external to the UPS. The purpose of the Backfeed Breaker is to prevent leakage current through the bypass circuit during an outage. This status message is self-clearing. When the condition is no longer present, the message and any control activity tied to the status event reverts to normal.	This status message is informational. If the breaker was not opened intentionally, or if the breaker is actually closed and this message is active, contact your factory-authorized service provider.
BPSS Ovld Exceeded	The Bypass Static Switch (BPSS) was turned off due to an extended overload. While the BPSS can sustain an overload greater than the Inverter and for a longer period of time, there are still limits on the amplitude and duration of overload that the BPSS can handle. This alarm indicates the overload was greater in amplitude and time than the BPSS can handle, and therefore shut off to prevent damage to the equipment.	Press "SILENCE" to silence the audible alarm. If CB3 is available (visible if present on the One-Line Display), close it to restore power to the load. DO NOT ATTEMPT TO CLOSE CB3 UNTIL THE SOURCE OF THE OVERLOAD IS IDENTIFIED AND ISOLATED. Once the overload source is isolated, restart the UPS by pressing "Startup," "Manual Start" and follow the prompts. If the overload condition does not clear, or the overload is cleared but the UPS does not restart, contact your factory-authorized service provider.
BPSS Unable	A problem has been detected in the Bypass Static Switch.	Press "SILENCE" to silence the audible alarm. Press "RESET" to attempt to clear the fault. Contact your factory-authorized service provider.

**Table 7     Liebert NXL alarm and status messages (continued)**

Event Message	Event Definition	Recommended Action
Breaker Close Fail	<p>This is a summary event that informs the user that a circuit breaker that was either signaled to close or was manually closed failed to report a closed status.</p> <p>The Breaker Close Fail event indicates a mismatch between the expected state of a breaker and the reported state of the breaker.</p>	<p>Press "SILENCE" to silence the audible alarm. Check the One-Line Display and the Active Event Window to determine which breaker or switch is open.</p> <p>If the open breaker cannot be reset or closed, or if all breakers are closed but the One-Line Display does not agree, or the alarm cannot be cleared, contact your factory-authorized service provider.</p>
Breaker Open Fail	<p>This is a summary event that informs the user a circuit breaker that was either signaled to open or was manually opened failed to report an open status.</p> <p>The Breaker Open Fail event indicates a mismatch between the expected state of a breaker and the reported state of the breaker.</p>	<p>Press "SILENCE" to silence the audible alarm. Check the One-Line Display and the Active Event Window to determine which breaker or switch that should be open is still closed.</p> <p>If a breaker that should be open shows closed, or if the breaker in question actually is open but the fault is still present, attempt to clear the fault by pressing "RESET."</p> <p>If the event does not reset, contact your factory-authorized service provider.</p>
Byp Overload Ph A	<p>The critical load is greater than 110% while the UPS is on bypass. The controls may shut the unit down if the overload condition does not clear within the allotted time. Allotted time is variable, and is inversely proportional to the amplitude of the overload, i.e., the greater the amplitude of the overload, the less time the unit continues to support the load.</p> <p>This alarm is self-clearing. When the condition is no longer present, the alarm and any control activity tied to the alarm reverts to normal.</p>	<p>Press "SILENCE" to silence the audible alarm. Observe the calculated load percentage on A phase displayed on the Module Output Meter. If the A phase steady state load percentage exceeds 110%, perform the following:</p> <p>If Maintenance Bypass is available, follow Standard Operating Procedures to transfer the load to Maintenance Bypass.</p> <p>If Maintenance Bypass is not available but the system has an Internal Bypass Breaker (CB3 on the One-Line Display), close CB3. Note that depending on the severity of the overload, the possibility exists that CB3 could trip if the overload exceeds the breaker rating.</p> <p>Investigate the overload condition.</p> <p>If the Module Output Meter does not indicate an overload condition, perform the previous steps and contact your factory-authorized service provider.</p>
Byp Overload Ph B	<p>The critical load is greater than 110% while the UPS is on bypass. The controls may shut the unit down if the overload condition does not clear within the allotted time. Allotted time is variable, and is inversely proportional to the amplitude of the overload, i.e., the greater the amplitude of the overload, the less time the unit continues to support the load.</p> <p>This alarm is self-clearing. When the condition is no longer present, the alarm and any control activity tied to the alarm reverts to normal.</p>	<p>Press "SILENCE" to silence the audible alarm. Observe the calculated load percentage on B phase displayed on the Module Output Meter. If the B phase steady state load percentage exceeds 110%, perform the following:</p> <p>If Maintenance Bypass is available, follow Standard Operating Procedures to transfer the load to Maintenance Bypass.</p> <p>If Maintenance Bypass is not available but the system has an Internal Bypass Breaker (CB3 on the One-Line Display), close CB3. Note that depending on the severity of the overload, the possibility exists that CB3 could trip if the overload exceeds the breaker rating.</p> <p>Investigate the overload condition.</p> <p>If the Module Output Meter does not indicate an overload condition, perform the previous steps and contact your factory-authorized service provider.</p>

**Table 7** Liebert NXL alarm and status messages (*continued*)

Event Message	Event Definition	Recommended Action
Byp Overload Ph C	<p>The critical load is greater than 110% while the UPS is on bypass. The controls may shut the unit down if the overload condition does not clear within the allotted time. Allotted time is variable, and is inversely proportional to the amplitude of the overload, i.e., the greater the amplitude of the overload, the less time the unit continues to support the load.</p> <p>This alarm is self-clearing. When the condition is no longer present, the alarm and any control activity tied to the alarm reverts to normal.</p>	<p>Press "SILENCE" to silence the audible alarm. Observe the calculated load percentage on C phase displayed on the Module Output Meter. If the C phase steady state load percentage exceeds 110%, perform the following:</p> <p>If Maintenance Bypass is available, follow Standard Operating Procedures to transfer the load to Maintenance Bypass.</p> <p>If Maintenance Bypass is not available but the system has an Internal Bypass Breaker (CB3 on the One-Line Display), close CB3. Note that depending on the severity of the overload, the possibility exists that CB3 could trip if the overload exceeds the breaker rating.</p> <p>Investigate the overload condition.</p> <p>If the Module Output Meter does not indicate an overload condition, perform the previous steps and contact your factory-authorized service provider.</p>
Bypass Breaker (CB3) Close Fail	The bypass circuit breaker has failed to respond to a close signal.	
Bypass Breaker (CB3) Open Fail	The bypass circuit breaker has failed to respond to an open signal.	
Bypass Line Fail	The bypass source is not present.	
Bypass Not Avail	<p>This summary event indicates a problem with the detected bypass voltage. If bypass is not available, transfers to bypass are disabled.</p> <p>This alarm is self-clearing. When the condition is no longer present, the alarm and any control activity tied to the alarm reverts to normal.</p>	<p>Press "SILENCE" to silence the audible alarm. Observe the One-Line Display. The bypass power line feeding the static switch is green when bypass power is within normal operating range. If the line feeding the static switch is orange, gray, or black, bypass voltage is out of tolerance. Also check the bypass voltage readings on the Bypass Meter.</p> <p>When the bypass returns to normal, this alarm clears automatically. If all indications checked above are normal and the alarm is still present, contact your factory-authorized service provider.</p> <p>If there is a problem indicated with the bypass voltage, investigate and resolve the issue.</p> <p>Examples of conditions that could cause this alarm: Unstable generator voltage; or, Bypass Feeder Breaker tripped.</p>
Bypass OF/UF	<p>The bypass frequency has exceeded the bypass frequency limit of <math>\pm 5</math> Hz of nominal. If this alarm is active, transfers to bypass are disabled.</p> <p>This alarm is self-clearing. When the condition is no longer present, the alarm and any control activity tied to the alarm reverts to normal.</p>	<p>Press "SILENCE" to silence the audible alarm. Check the frequency on the Bypass Meter. If the frequency is outside the synchronization range, investigate and resolve the issue.</p> <p>This alarm is commonly the result of an uncalibrated generator, or power anomalies on the utility feed. Check bypass power for nominal limits.</p> <p>If bypass frequency appears normal, contact your factory-authorized service provider.</p>
Controller Error	<p>This is a summary event that indicates a DSP communication error.</p> <p>The Controller Error event is a fault condition that indicates a loss of communications in the controls.</p>	<p>Press "SILENCE" to silence the audible alarm. Press "RESET" to attempt to reset the fault.</p> <p>Contact your factory-authorized service provider.</p>

**Table 7     Liebert NXL alarm and status messages (continued)**

Event Message	Event Definition	Recommended Action
Controls Comm Fail	The Controls Communication Failure event indicates a loss of communications between the Controls and Human Machine Interface (HMI). The Controls Communication Failure event is displayed when the HMI detects a loss of communication with Controls on the Controller Area Network (CAN). An infrequent occurrence that resets immediately is probably not serious.	If the alarm does not clear, or if the alarm condition returns, contact your factory-authorized service provider.
Controls Reset Required	This alarm means one or more critical settings have been changed by user during UPS operation. The change(s) will not take effect until after a UPS Controls reset. This operation should only be performed by an authorized service personnel. This alarm is cleared after UPS Controls reset.	Press "SILENCE" to silence the audible alarm.
DC Link Gnd Fault -	The negative DC Bus has a ground fault. The UPS controls monitor the DC Bus negative half for a voltage imbalance caused by current flow to ground. This fault means excessive ground current is detected. In normal operation, with the batteries connected, the most likely cause of a current path to ground is a leaking battery. If your system includes an optional Battery Ground Fault Monitor, check if the Battery Ground Fault message is present also.	Press "SILENCE" to silence the audible alarm. Press "RESET" to clear the fault. Perform a visual inspection of the batteries. Look for signs of leaking battery acid or excessively corroded battery terminals. If there are no visible signs of defective batteries, open one Battery Breaker. Press "RESET" and see if the condition clears. If the condition clears, you have isolated the problem to that battery string. If the condition will not clear, repeat the test with each connected battery string. Once the location is identified, or if the battery string tests are inconclusive, contact your factory-authorized service provider.
DC Link Gnd Fault +	The positive DC Bus has a ground fault. The UPS controls monitor the DC Bus positive half for a voltage imbalance caused by current flow to ground. This fault means excessive ground current is detected. In normal operation, with the batteries connected, the most likely cause of a current path to ground is a leaking battery. If your system includes an optional Battery Ground Fault Monitor, check if the Battery Ground Fault message is present also.	Press "SILENCE" to silence the audible alarm. Press "RESET" to clear the fault. Perform a visual inspection of the batteries. Look for signs of leaking battery acid or excessively corroded battery terminals. If there are no visible signs of defective batteries, open one Battery Breaker. Press "RESET" and see if the condition clears. If the condition clears, you have isolated the problem to that battery string. If the condition will not clear, repeat the test with each connected battery string. Once the location is identified, or if the battery string tests are inconclusive, contact your factory-authorized service provider.
EMO Shutdown	An Emergency Module Off (EMO) command has been detected. The EMO signal means the front panel EMO button was pressed. A Remote EMO would display the "REMO Shutdown" alarm. In response to an EMO, the UPS transfers to Bypass and shuts off.	Press "SILENCE" to silence the audible alarm. Resolve the issue that precipitated the EMO. For safety, the UPS latches an EPO event. To clear the latch, press the EMO Reset pushbutton on the External Interface Board (EIB). Verify the EMO is cleared by pressing "RESET" and observing that the EPO alarm in the Active Event Window is gone. Restart the UPS by pressing "Startup," "Manual Start," and follow the prompts.

Table 7 Liebert NXL alarm and status messages (*continued*)

Event Message	Event Definition	Recommended Action
EPO Shutdown	The UPS shuts down in response to an active Emergency Power Off (EPO) command.	<p>Press "SILENCE" to silence the audible alarm. Resolve the issue that precipitated the EPO. For safety, the UPS latches an EPO event. There are two ways to clear the latch:</p> <ol style="list-style-type: none"> <li>1. Press the EPO Reset pushbutton on the External Interface Board (EIB).</li> <li>2. From HMI front panel display, press OK button when " Press OK to Reset EPO Latched signal" message is displayed in a dialog box.</li> </ol> <p>Verify the EPO is cleared by observing the EPO alarm in the Active Event Window is gone. Restart the UPS by pressing "Startup," "Manual Start," and follow the prompts.</p>
Equip Ovtemp	This summary event indicates the UPS is nearing an over temperature condition. Depending on which sensor is reporting the high temperature, the UPS may do one of three things once the limit is reached: shut down, transfer to bypass, or transfer to battery operation. This is a potentially serious event.	<p>Investigate possible causes for a rising temperature condition, such as loss of air conditioning, airflow obstructions, etc. If the ambient temperature is high due to loss of air conditioning and cannot be addressed immediately, perform the following:</p> <ol style="list-style-type: none"> <li>1. Press "Transfer," "Bypass" to transfer the UPS to bypass.</li> <li>2. Press "SILENCE" to silence the audible alarm.</li> <li>3. Wait at least 15 minutes, then attempt to reset the alarm by pressing "RESET."</li> <li>4. If the alarm clears and proper cooling has been restored to the UPS, press "Transfer," "UPS" to transfer back to UPS.</li> </ol> <p>If this alarm is present and no external factors are affecting proper cooling of the UPS, contact your factory-authorized service provider.</p>



Table 7 Liebert NXL alarm and status messages (continued)

Event Message	Event Definition	Recommended Action
Equip Ovtemp Limit	This summary event occurs when one or more internal temperatures have exceeded the maximum temperature setpoint. This is the second of two over temperature alarms. The first, "Equipment Overtemperature Warning," sets when the detected temperature is near the limit. The controls react to this condition in various ways, depending on which sensor is reporting the over temperature condition.	<p>Press "SILENCE" to silence the audible alarm. Check the One-Line Display for system status:</p> <ol style="list-style-type: none"> <li>1. UPS Off               <ol style="list-style-type: none"> <li>a. If external Maintenance Bypass is available, close the Maintenance Bypass Breaker (MBB) to restore power to the load. Do not attempt to restart the UPS without first contacting your factory-authorized service provider.</li> <li>b. If external Maintenance Bypass is not available, but the CB3 option is visible on the One-Line Display, verify the bypass line is green and close CB3 to restore power to the load. Contact your factory-authorized service provider.</li> </ol> </li> <li>2. UPS On Bypass               <ol style="list-style-type: none"> <li>a. Verify the bypass line is green. If it is not, contact your factory-authorized service provider immediately and prepare to shut down the load.</li> <li>b. If external Maintenance Bypass is available, close the Maintenance Bypass Breaker (MBB) to place the load on Maintenance Bypass. Do not attempt to re-transfer to UPS without first contacting your factory-authorized service provider.</li> <li>c. If external Maintenance Bypass is not available, but the CB3 option is visible on the One-Line Display, close CB3. Do not attempt to re-transfer to UPS without first contacting your factory-authorized service provider.</li> </ol> </li> <li>3. UPS On Battery               <ol style="list-style-type: none"> <li>a. Verify the bypass line is green. If it is not, contact your factory-authorized service provider immediately and prepare to shut down the load.</li> <li>b. If the bypass line is green, press "Transfer", "Bypass", to transfer the load to bypass.</li> <li>c. If there is a CB3 present on the One-Line Display, close CB3. If CB3 is not present and external Maintenance Bypass is available, close the MBB to place the load on Maintenance Bypass. If both CB3 and Maintenance Bypass are present, first close CB3, then close the external MBB. If CB3 or external Maintenance Bypass is not available, shut down the UPS by pressing "Shutdown", "UPS" and contact your factory-authorized service provider.</li> </ol> </li> </ol>

**Table 7     Liebert NXL alarm and status messages (continued)**

Event Message	Event Definition	Recommended Action
Excess Auto Rexfers	<p>The UPS has re-transferred too many times and is now locked on bypass.</p> <p>The UPS attempts to perform an automatic transfer back to Inverter, if the reason for the transfer to bypass is determined by the controls to be automatically recoverable; for example, a temporary overload.</p> <p>The number of times the UPS attempts to recover from an automatic transfer to bypass is limited. When the number of transfers exceeds the number allowable (default is 5 transfers per hour), the UPS remains on bypass, and display this message.</p> <p>An example of a condition that could cause this alarm is cycling load to the UPS where the peak load exceeds the overload settings. The UPS transfers on the overload, re-transfers to Inverter, then the overload returns. Once this occurs 5 times within one hour, the user must manually transfer the UPS back online.</p>	<p>Press "SILENCE" to silence the audible alarm.</p> <p>Press "RESET" to clear any active faults or alarms. Provided there are no alarms or faults still present that could prevent a transfer, press "Transfer," "UPS," to transfer back to Inverter.</p> <p>If the transfer is successful, press "RESET" to clear the alarm. Otherwise, contact your factory-authorized service provider.</p>
Excess Paralleling	<p>When the controls detect a high amplitude, short duration overload condition on the output, the static switch is turned on momentarily in parallel with the Inverter to attempt to clear the condition. If the fault clears, the controls turn off the static switch and the load remains on Inverter. This fault condition indicates the UPS pulse paralleled too many times and is now locked on bypass (auto re-transfers to Inverter are inhibited).</p>	<p>Press "SILENCE" to silence the audible alarm.</p> <p>Check the Module Output Meter and verify the output currents are normal, the kVA/kW percentages are less than 100%, and the Rexfer Timeout is 00:00.</p> <p>Verify the Inverter box on the One-Line Display is green.</p> <p>Investigate any other active alarms or faults before attempting to clear this fault.</p> <p>Press "RESET" to clear the fault.</p> <p>If the Event Window is clear, press "Transfer," "UPS" to transfer the load back to Inverter.</p> <p>If the "UPS" button is grayed out, or pressing the "UPS" button does not transfer the unit back to Inverter, or if the UPS immediately transfers back to bypass, contact your factory-authorized service provider.</p>
Fuse Fail	<p>This is a summary event that indicates a fuse has opened. There are several fuses that can cause this fault.</p> <p>The Fuse Failure event is caused by one or more fuses reporting a failed status. The UPS may or may not transfer to bypass as a result of the failed fuse.</p>	<p>Press "SILENCE" to silence the audible alarm.</p> <p>Check the One-Line Display and other indicators to determine the state of the unit and take appropriate action.</p> <p>Contact your factory-authorized service provider.</p>
Inlet Ovtemp	<p>The air flowing into the UPS is too warm.</p> <p>This alarm is self-clearing. When the condition is no longer present, the alarm and any control activity tied to the alarm reverts to normal.</p>	<p>Press "SILENCE" to silence the audible alarm.</p> <p>Check the Inlet Air Temperature on the One-Line Display and verify the reading is accurate, i.e. is the room temperature warmer than normal?</p> <p>If the room temperature is warmer than normal, investigate and resolve the issue.</p> <p>If the room temperature is normal, and the Inlet Air Temp reading on the One-Line Display is higher than normal, contact your factory-authorized service provider.</p>

**Table 7     Liebert NXL alarm and status messages (continued)**

Event Message	Event Definition	Recommended Action
Inp Phase Rotation	<p>The correct input phase rotation should be clockwise, or A-B-C. This alarm indicates the sensed input phase rotation is counter-clockwise. If this alarm occurs on an operational unit, it typically indicates upstream work was performed (input side) and the input wiring was connected incorrectly.</p> <p>This alarm is self-clearing. When the condition is no longer present, the alarm and any control activity tied to the alarm reverts to normal.</p>	<p>Press "SILENCE" to silence the audible alarm. Verify correct phase rotation at the input. If the phase rotation is correct, contact your factory-authorized service provider.</p>
Input Contact XY	<p>The displayed text for this alarm is dependent on settings.</p> <p>In response to this alarm, the user may see 1 of 4 possible messages:</p> <ol style="list-style-type: none"> <li>1. No message but the help icon (lowercase "i") is present;</li> <li>2. A custom message programmed by the user;</li> <li>3. "Input Contact XY" if the contact is unconfigured;</li> <li>4. "Reduced Rect ILimit" if the contact is programmed as Pre-assigned.</li> </ol> <p>If this event is active, an external signal is wired into Channel Y of Input Contact Isolator #X.</p> <p>If the display shows Case 1 above (blank message), it means the contact channel is set to default but the default message was erased.</p> <p>If the display shows Case 2, the user-programmed event is active and the displayed text is customer defined.</p> <p>If the display shows Case 3, the contact is active but was not pre-programmed (default condition).</p> <p>If the display shows Case 4, the controls force the Rectifier into Reduced Input Current Limit operation (this limits the amount of current available to charge the battery - typically during generator operation).</p> <p>This alarm message is self-clearing. When the condition is no longer present, the message and any control activity tied to the alarm will revert to normal.</p>	<p>Check the wires landed on Input Contact Isolator #X.</p> <p>If the signal is not active, or no wires are present, contact your factory-authorized service provider.</p>
Input Contact Interface #1 Communication Failure	Input Contact Interface #1 has failed to communicate in a timely fashion.	
Input Contact Interface #2 Communication Failure	Input Contact Interface #2 has failed to communicate in a timely fashion.	
Input Current Imbal	<p>The detected input currents are not balanced. This latching alarm indicates a potential problem in the input filter. The controls automatically open the filter contactor in response to this condition. The filter contactor must be manually closed once it opens in response to this alarm.</p>	<p>Press "SILENCE" to silence the audible alarm. Press "RESET" to attempt to clear the alarm condition.</p> <p>If the alarm clears, press "Startup," "Device Control," "Close Trap" to manually close the filter contactor.</p> <p>If the contactor remains closed, check the Input Meter and verify the input currents are balanced. If the contactor re-opens and the "Input Current Imbalance" returns, silence the alarm, leave the filter contactor open, and contact your factory-authorized service provider.</p>

**Table 7     Liebert NXL alarm and status messages (continued)**

Event Message	Event Definition	Recommended Action
Input Current Limit	An active Input Current Limit alarm means the detected input current (RMS) exceeds the limit setpoint (default is 125%). This may be normal depending on various operating conditions, such as input voltage level, output load level, and whether the batteries have recently discharged. This alarm is self-clearing. When the condition is no longer present, the alarm and any control activity tied to the alarm reverts to normal.	Press "SILENCE" to silence the audible alarm. Observe the meters on the One-Line Display for input voltage level, battery charge/discharge current, and output load percentage kW. Investigate any abnormal readings. If the reason for the alarm cannot be determined, contact your factory-authorized service provider.
Input Disconnect (Q1) Open	The rectifier disconnect device indicates that it is in the open position.	
Input Disconnect (Q11) Open	The externally mounted input isolator indicates that it is in the open position.	
Input Filter Cycle	The Input Filter Disconnect is locked open. The Input Filter Disconnect Cycle counter has exceeded the setpoint. The Input Filter Disconnect opens automatically as determined by the disconnect settings, or because of an unusual condition. An example of a setting would be to automatically open the filter disconnect under light load conditions to improve the input power factor. An example of an unusual condition would be unbalanced currents on the input, possibly because of a suspect component in the filter itself.	Press "SILENCE" to silence the audible alarm. Attempt to manually close the disconnect by pressing "Startup," "Device Control," "Close Trap." If the condition which caused the filter disconnect to lock open is still present, it re-opens. If the disconnect cannot be manually closed or the alarm cannot be cleared, contact your factory-authorized service provider.
Input Not Avail	This summary alarm means there is a problem with input power. It is not acceptable to the Rectifier. If the unit is running normally when this event occurs, the UPS goes to battery. This alarm is self-clearing. When the condition is no longer present, the alarm and any control activity tied to the alarm reverts to normal.	Press "SILENCE" to silence the audible alarm. Examine the One-Line Display. The Rectifier input line feeding the Input Breaker should be green. If not, investigate source power to the UPS. If input power is good, and this alarm is active, contact your factory-authorized service provider.
Internal Comm Error	This is a summary event caused by an interruption in communication between the controls and a device on the Controller Area Network (CAN). The Internal Communication Error event indicates a loss of communications between the controls and an external device. The Internal Communication Error is displayed when the controls detect a loss of communication to a device on the Controller Area Network (CAN). An infrequent occurrence that resets immediately is probably not serious.	Press "SILENCE" to silence the audible alarm. Press "RESET" to clear the alarm. If the alarm cannot be reset, or if the alarm condition returns, contact your factory-authorized service provider.
Inv Overload Ph A	An overload condition is active on A phase. A phase load condition exceeds 105%. A countdown timer is displayed on the One-Line Display in response to this alarm, and indicates the time remaining until a transfer to bypass occurs. The length of time remaining until transfer is directly proportional to the severity of the overload. This alarm is self-clearing. When the condition is no longer present, the alarm and any control activity tied to the alarm reverts to normal.	Press "SILENCE" to silence the audible alarm. Check the Module Output Meter and note the A phase load percentage. If possible, reduce A phase loading. If the steady state load remains above 105%, allow the UPS to transfer to bypass and contact your factory-authorized service provider. If the displayed load percentage is less than 100% and the alarm is still active, contact your factory-authorized service provider.

**Table 7** Liebert NXL alarm and status messages (*continued*)

Event Message	Event Definition	Recommended Action
Inv Overload Ph B	An overload condition is active on B phase. B phase load condition exceeds 105%. A countdown timer is displayed on the One-Line Display in response to this alarm, and indicates the time remaining until a transfer to bypass occurs. The length of time remaining until transfer is directly proportional to the severity of the overload. This alarm is self-clearing. When the condition is no longer present, the alarm and any control activity tied to the alarm reverts to normal.	Press "SILENCE" to silence the audible alarm. Check the Module Output Meter and note the B phase load percentage. If possible, reduce B phase loading. If the steady state load remains above 105%, allow the UPS to transfer to bypass and contact your factory-authorized service provider. If the displayed load percentage is less than 100% and the alarm is still active, contact your factory-authorized service provider.
Inv Overload Ph C	An overload condition is active on C phase. C phase load condition exceeds 105%. A countdown timer is displayed on the One-Line Display in response to this alarm, and indicates the time remaining until a transfer to bypass occurs. The length of time remaining until transfer is inversely proportional to the severity of the overload. This alarm is self-clearing. When the condition is no longer present, the alarm and any control activity tied to the alarm reverts to normal.	Press "SILENCE" to silence the audible alarm. Check the Module Output Meter and note the C phase load percentage. If possible, reduce C phase loading. If the steady state load remains above 105%, allow the UPS to transfer to bypass and contact your factory-authorized service provider. If the displayed load percentage is less than 100% and the alarm is still active, contact your factory-authorized service provider.
Inv Ovld Exceeded	This message is displayed in response to an overload on one or more output phases. When an overload occurs, the controls display a countdown timer that displays the time remaining until a transfer to bypass occurs. The length of the timer is inversely proportional to the amplitude of the overload. When the timer reaches zero, the UPS transfers to bypass and populates the Active Event Window with this alarm. This fault is non-latching. When the underlying condition is no longer present, this fault and any control activity tied directly to this fault reverts to normal.	Press "SILENCE" to silence the audible alarm. Observe the load percentages for each phase on the Module Output Meter. If the load is less than 100%, attempt to transfer back to Inverter by pressing "Transfer," "UPS." If the transfer is successful, investigate the reason for the overload and take appropriate action. If the transfer is unsuccessful, contact your factory-authorized service provider.
Inverter Fault	This summary event indicates a potentially serious problem in the Inverter. The controls react to an Inverter fault in different ways depending on the root event that caused the fault. If bypass is available, the controls transfer to static bypass. A restart may or may not be possible	Press "SILENCE" to silence the audible alarm. Check the One-Line Display to determine the state of the UPS. If both the Rectifier and Inverter are shut off, press "RESET" to attempt to clear any latched alarms or faults. Attempt a restart by pressing "Startup," "Manual Start," and follow the prompts to place the UPS back in service. If the startup fails, contact your factory-authorized service provider. If the Rectifier and Inverter appear to be running, press "RESET" to attempt to clear any latched alarms or faults, then attempt a transfer by pressing "Transfer," "UPS." If the transfer is successful, contact your factory-authorized service provider. If the transfer is unsuccessful, contact your factory-authorized service provider.
ISS SCR Shorted	The controls have detected voltage on the Inverter (Line side) side of the Inverter Static Switch. This indicates that an SCR is shorted. With the Output SCRs turned off, there should be no voltage present inside the UPS. This is a non-recoverable fault, and inhibits normal start up of the UPS.	Press "SILENCE" to silence the audible alarm. Turn off Control Power to clear the event. Wait 5 minutes before re-applying Control Power. If the fault fails to clear, contact your factory-authorized service representative.

**Table 7     Liebert NXL alarm and status messages (continued)**

Event Message	Event Definition	Recommended Action
LBS Inhibited	With LBS operation enabled, conditions required to allow LBS operation are not met. Voltage or Frequency differences sensed by the LBS control are preventing the ability of LBS to function correctly. This alarm is self-clearing. When the condition is no longer present, the alarm and any control activity tied to the alarm reverts to normal.	Press "SILENCE" to silence the audible alarm. Check both Systems and verify normal operation: <ul style="list-style-type: none"> <li>a. Both Systems running online on inverter;</li> <li>b. Neither System in Maintenance Bypass;</li> <li>c. No Bypass, Input, or Synchronization errors present on either system.</li> </ul> If the cause of the alarm cannot be determined by checking both Systems, contact your factory-authorized service provider.
LBS Operating	Load Bus Synchronization (LBS) is enabled and is active. This status message informs the user that one system in an LBS system has lost its synchronization source (usually its own Bypass) and is now synchronized to the other system by the LBS controls. This status message is self-clearing. When the condition is no longer present, the alarm and any control activity tied to the alarm reverts to normal.	Under normal circumstances, none. If this message is active, and there is no clear reason why the LBS circuit should be active, contact your factory-authorized service provider.
Leading Pwr Factor	With a load of 80% or greater, the controls have calculated the output Power Factor to be less than .95 leading. Leading Power Factors result in wasted energy. If the Power Factor is less than .95 leading, the UPS output is de-rated to compensate for output losses. This alarm is self-clearing. When the condition is no longer present, the alarm and any control activity tied to the alarm reverts to normal.	Press "SILENCE" to silence the audible alarm. Check the Output Meter readings and verify the Output Power Factor. If the displayed power factor is less than .95 leading, and the load is greater than 80%, reduce the load or investigate. Contact your factory-authorized service representative.
Load on Bypass	The load is being supplied by bypass.	None.
Load on Maint Byp	The load is on Maintenance Bypass.	None.
Low Batt Capacity	One or more battery circuit breakers are open. This alarm applies if the system includes more than one battery circuit breaker, and at least one is closed, but one or more are open. This alarm is self-clearing. When the condition is no longer present, the alarm and any control activity tied to the alarm reverts to normal.	Press "SILENCE" to silence the audible alarm. To clear this alarm, verify all battery breakers are closed. Investigate any open breakers.
Low Batt Shutdown	The Battery has reached End of Discharge (EOD). There is no longer enough energy left in the battery to run the Inverter with the current load. If bypass is available, the UPS attempts to transfer the load to bypass at EOD.	Press "SILENCE" to silence the audible alarm. Once power is restored, attempt a normal restart of the UPS. If the restart fails, contact your factory-authorized service provider.
Low Battery Warning	The battery is nearly depleted, and the unit shuts down very soon. The Low Battery Warning setpoint is adjustable under User Settings. This alarm means the calculated time remaining on battery is now less than the Low Battery Warning setpoint. This alarm is self-clearing. When the condition is no longer present, the alarm and any control activity tied to the alarm reverts to normal.	Check to see if bypass is available by observing the One-Line Display. Acceptable bypass voltage is indicated by a green power line feeding the Static Bypass Switch (BPSS) box. If bypass is available, press "Transfer," "Bypass" to transfer to bypass. If the bypass is qualified, the UPS transfers to the bypass source. If bypass is not available, prepare to shut down critical loads, or remove non-essential loads in order to extend battery run time so that critical loads may be shut down in an orderly manner.

**Table 7     Liebert NXL alarm and status messages (continued)**

Event Message	Event Definition	Recommended Action
Low Power Factor	<p>The output power factor is low.  The output power factor is less than 70% leading or lagging. A simplified explanation of power factor is the ratio of energy being supplied to energy being used by the load. For a given load, the current output of the UPS goes up as power factor decreases.  This results in the UPS output being derated. For example, study the following:  Load = 100 kw @ 480V  amps = kw X 1000 / volts X power factor X 1.73 (square root of 3)  100kw X 1000 = 100000  480volts X .9PF X 1.73 = 747.36  100000/747.36 = 133.8 amps  Now, replace the .9 power factor (typical computer load power factor) with .7 power factor:  100kw X 1000 = 100000  480volts X .7PF X 1.73 = 581.28  100000/581.28 = 172 amps  The load remains the same, but the current required to supply it is roughly 30% higher. The extra current is wasted energy that can result in nuisance trips of breakers, overheating of cables, and other unwanted conditions. The UPS cannot control the output power factor.  This alarm is notification to the</p>	<p>Press "SILENCE" to silence the audible alarm. Evaluate the load on the UPS. For more information, contact your factory-authorized service provider.</p>
Main Control Fault	<p>The UPS has transferred to Bypass due to a loss of communications with the Main Controller. All Transfers, Startup, Shutdown, and Metering screens are locked out.  The Controls attempt to reestablish communications but will not return the load to inverter automatically.</p>	<p>Press "SILENCE" to silence the audible alarm. Contact your factory-authorized service provider. If communications are reestablished, the One-Line Display will be restored; however, Liebert does not recommend attempting to return the load to inverter until a service visit has been made and action taken to determine why the fault occurred. Action will involve resetting the UPS controls by removing and then reapplying control power. Therefore, it will be necessary to utilize maintenance bypass, either by closing the optional CB3 internal bypass breaker, or by closing the optional external Maintenance Bypass Breaker (MBB). Liebert does not recommend the user, or operator, attempt this without first speaking with an authorized service associate from Liebert.</p>
Maintenance Bypass Breaker (MBB) Open	<p>The maintenance bypass breaker indicates that it is in the open position</p>	
Man Rexfer Inhibit	<p>This summary event means the conditions required to perform a manual transfer to Inverter (online) are not met (Inverter must be in sync with bypass).  This status message is self-clearing. When the condition is no longer present, the message and any control activity tied to the status event reverts to normal.</p>	<p>The condition clears from the Active Event Window when manual re-transfers are enabled. A possible reason for this condition is an unstable generator. If the generator frequency is not stable, or not at 60 Hz, the Inverter may have difficulty maintaining or acquiring synchronization with the bypass source.  To check the synchronization of the Inverter to bypass, click "Transfer" and observe the synchroscope. A non-sync condition is indicated by a varying phase angle error, rather than a stable "0" degree indication.  If the unit is not on generator, and the bypass voltage otherwise appears normal, contact your factory-authorized service provider.</p>

**Table 7 Liebert NXL alarm and status messages (continued)**

Event Message	Event Definition	Recommended Action
Manual Xfer Inhibit	<p>This summary event means the conditions required to perform a manual transfer to bypass are not met (Inverter must be in sync with bypass).</p> <p>This status message is self-clearing. When the condition is no longer present, the message and any control activity tied to the status event reverts to normal</p>	<p>The condition clears from the Active Event Window when manual transfers are enabled.</p> <p>A possible reason for this condition is an unstable generator. If the generator frequency is not stable, or not at 60 Hz, the Inverter may have difficulty maintaining synchronization with the bypass source.</p> <p>To check the synchronization of the Inverter to bypass, click "Transfer" and observe the synchroscope. A non-sync condition is indicated by a varying phase angle error, rather than a stable "0" degree indication.</p> <p>If the unit is not on generator, and the bypass voltage otherwise appears normal, contact your factory-authorized service provider.</p>
Max Load Alarm Ph A	<p>The user adjustable maximum load alarm threshold was exceeded. This is a "notification only" type alarm, meaning the UPS takes no action other than sounding an audible alarm based on this setpoint. The setting allows the user to monitor the load status of the UPS.</p> <p>For example, if the current load on Phase A is 50%, the user can set this setpoint to 80% and an alarm is received if the added load exceeds 80%. The alarm may also be configured with a delay, to prevent nuisance alarms due to cycling loads. The alarm is self-clearing. Once the load level decreases to less than 95% of the level setting, the alarm clears.</p>	<p>Press "SILENCE" to silence the audible alarm. Check the kW load % displayed for A phase. To check the setpoint for the alarm, press "Config," "User Settings," "Adjustable Setpoints," "Max Load Alarm."</p> <p>Compare the setpoint to the displayed load percentage. If the load percentage displayed is correct and the value exceeds the setpoint, raise the setpoint to clear the alarm, or reduce the load below the setpoint.</p> <p>Contact your factory-authorized service provider.</p>
Max Load Alarm Ph B	<p>The user adjustable maximum load alarm threshold was exceeded. This is a "notification only" type alarm, meaning the UPS takes no action other than sounding an audible alarm based on this setpoint. The setting allows the user to monitor the load status of the UPS.</p> <p>For example, if the current load on Phase B is 50%, the user can set this setpoint to 80% and an alarm is received if the added load exceeds 80%. The alarm may also be configured with a delay, to prevent nuisance alarms due to cycling loads. The alarm is self-clearing. Once the load level decreases to less than 95% of the level setting, the alarm clears.</p>	<p>Press "SILENCE" to silence the audible alarm. Check the kW load % displayed for B phase. To check the setpoint for the alarm, press "Config," "User Settings," "Adjustable Setpoints," "Max Load Alarm."</p> <p>Compare the setpoint to the displayed load percentage. If the load percentage displayed is correct and the value exceeds the setpoint, raise the setpoint to clear the alarm, or reduce the load below the setpoint.</p> <p>Contact your factory-authorized service provider.</p>
Max Load Alarm Ph C	<p>The user adjustable maximum load alarm threshold was exceeded. This is a "notification only" type alarm, meaning the UPS takes no action other than sounding an audible alarm based on this setpoint. The setting allows the user to monitor the load status of the UPS.</p> <p>For example, if the current load on Phase C is 50%, the user can set this setpoint to 80% and an alarm is received if the added load exceeds 80%. The alarm may also be configured with a delay, to prevent nuisance alarms due to cycling loads. The alarm is self-clearing. Once the load level decreases to less than 95% of the level setting, the alarm clears.</p>	<p>Press "SILENCE" to silence the audible alarm. Check the kW load % displayed for C phase. To check the setpoint for the alarm, press "Config," "User Settings," "Adjustable Setpoints," "Max Load Alarm."</p> <p>Compare the setpoint to the displayed load percentage. If the load percentage displayed is correct and the value exceeds the setpoint, raise the setpoint to clear the alarm, or reduce the load below the setpoint.</p> <p>Contact your factory-authorized service provider.</p>
MBD Open	<p>The Module battery disconnect is open.</p> <p>This alarm is self-clearing. When the condition is no longer present, the alarm and any control activity tied to the alarm reverts to normal.</p>	<p>Press "SILENCE" to silence the audible alarm. Check the status of Module Battery Disconnect (MBD). If it is open, the alarm is normal.</p> <p>If the Module Battery Disconnect is closed, contact your factory-authorized service provider.</p>



**Table 7**    **Liebert NXL alarm and status messages (continued)**

Event Message	Event Definition	Recommended Action
Multiple Fan Fail	This summary event is active when more than one fan has failed.	Press "SILENCE" to silence the audible alarm. Press "RESET" to clear the alarm. If the alarm will not clear, contact your factory-authorized service provider.
On Gen Active	The UPS input source is generator. An external signal is being used to inform the UPS when the power source is generator rather than utility, and the signal is active. This status message is self-clearing. When the condition is no longer present, the message and any control activity tied to the status event reverts to normal.	Under normal conditions, no user action is required. If the UPS is not actually on generator and this message is active, contact your factory-authorized service provider.
Outlet Ovtemp Limit	The difference between the inlet air temperature and the outlet air temperature is too great. This alarm means excessive heat is being generated internally resulting in a higher than normal exhaust air temperature. If the Bypass is within limits, the UPS reacts to this alarm by transferring to Bypass and shutting off the Inverter. This alarm is self-clearing. When the condition is no longer present, the alarm and any control activity tied to the alarm reverts to normal.	Press "SILENCE" to silence the audible alarm. Check the Inlet Air Temperature on the One-Line Display and verify the reading is accurate, i.e. is the room temperature warmer than normal? If the room temperature is warmer than normal, investigate and resolve the issue. If the room temperature is normal, and the Inlet Air Temp reading on the One-Line Display is higher than normal, contact your factory-authorized service provider.
Output Fault	This summary event occurs when the detected system output exceeds acceptable limits in either voltage or frequency. If the UPS was on Inverter at the time of the event, the UPS transfers to bypass provided the bypass voltage is available. If the UPS was on bypass at the time of the event, the UPS shuts down rather than allowing unacceptable voltage to reach the load.	Press "SILENCE" to silence the audible alarm. Check the Active Event Window and investigate other events to further analyze. Press "RESET" to attempt to reset any latched events. Check the One-Line Display to determine the system status (on UPS, Bypass, or Off). Check the input and bypass (dual input only) and observe the One-Line color. Green indicates good power present, orange means power is present but outside nominal range, and gray means power is not present. If the load is off and the input voltage is ok, attempt to restart the UPS by pressing "Startup," "Manual Start," and follow the prompts. If the Input Meter indicates input or bypass is not available, investigate and resolve the power problem. If the load is on bypass and all alarms are reset, press "Transfer," "UPS," to attempt to transfer back to Inverter. If the issue cannot be resolved, contact your factory-authorized service provider.

**Table 7**    **Liebert NXL alarm and status messages (continued)**

Event Message	Event Definition	Recommended Action
Rectifier Fault	<p>This summary event indicates a potentially serious condition in the Rectifier circuit. The controls respond to this by turning off the Rectifier, opening the input filter contactor, and placing the UPS on battery operation. This fault is non-latching. When the underlying condition is no longer present, this fault and any control activity tied directly to this fault reverts to normal.</p>	<p>Observe the One-Line Display and the Active Event Window for current UPS condition - On Battery? Observe the color of the Bypass Line on the One-Line Display. If green, bypass is available. This is significant, because if the batteries fail, the UPS transfers safely to the bypass line.</p> <p>If the UPS is on battery, and the bypass line on the One-Line Display is not green, contact your factory-authorized service provider immediately and prepare to shut down as the UPS turns off once the batteries are depleted. Press "SILENCE" to silence the audible alarm.</p> <p>Press "RESET" to attempt to clear the fault condition. If the Rectifier Fault clears, press "Startup," "Manual Start," "Rectifier" to attempt to restart the Rectifier.</p> <p>If this is successful, observe normal operation of the Rectifier, indicated on the One-Line Display by a green outline around the Rectifier box, and normal DC Bus voltage on the DC Bus Meter. If the Rectifier starts normally, attempt to close the input filter contactor by pressing "Startup," "Device Control", "Close Trap".</p> <p>If the UPS is not on battery, but transferred to bypass, contact your factory-authorized service provider.</p> <p>If the Rectifier Fault was cleared by pressing "RESET", but the fault returns as soon as a Rectifier restart is attempted, contact your factory-authorized service provider.</p>
Redundant Fan Fail	This alarm indicates a fan has failed	<p>Press "SILENCE" to silence the audible alarm.</p> <p>Contact your factory-authorized service provider.</p>
Regen Active	<p>Regeneration Mode is a service mode that is normally controlled by the service technician. Regeneration Mode Status or Alarm messages are generally intended for the service person. This status message informs the user the UPS is in Regeneration Mode.</p> <p>This status message is self-clearing. When the condition is no longer present, the alarm and any control activity tied to the alarm reverts to normal.</p>	<p>Under normal circumstances, none.</p> <p>If this message is active, and there is no clear reason why the UPS is in Regeneration Mode, contact your factory-authorized service provider.</p>
Regen Failure	<p>Regeneration Mode was initiated and terminated because of an abnormal condition. Once Regeneration Mode is active, any condition, for example an Inverter Overload, other than the user manually stopping Regeneration Mode, causes this message to appear.</p> <p>Regeneration Mode is a service mode that is normally controlled by the service technician. Regeneration Mode Status or Alarm messages are generally intended for the service person. This status message informs the user the UPS is in Regeneration Mode.</p> <p>This status message is self-clearing. When the condition is no longer present, the alarm and any control activity tied to the alarm reverts to normal.</p>	<p>Press "SILENCE" to silence the audible alarm.</p> <p>Press "RESET" to attempt to clear the alarm.</p> <p>If Regeneration Mode was not manually initiated by service, or if this alarm will not reset, contact your factory-authorized service provider.</p>

**Table 7 Liebert NXL alarm and status messages (continued)**

Event Message	Event Definition	Recommended Action
Regen Terminated	Regeneration Mode is a service mode that is normally controlled by the service technician. Regeneration Mode Status or Alarm messages are generally intended for the service person. This status message informs the user that Regen Mode is no longer active. This status message is self-clearing. When the condition is no longer present, the alarm and any control activity tied to the alarm reverts to normal.	Under normal circumstances, none. If this message is active, and there is no clear reason why the UPS was in Regeneration Mode, or if the command to terminate Regeneration Mode was not issued, contact your factory-authorized service provider.
Remote Off BPSS	The Static Bypass Switch (BPSS) was turned off by an external signal. This indicates an external signal forcing the BPSS to remain off is active. This type of signal is wired into an Input Contact Isolator and the specific channel is assigned as Remote Off BPSS. This status message is self-clearing. When the condition is no longer present, the message and any control activity tied to the status event reverts to normal.	Check the state of the Remote Off BPSS signal. If this signal is not active, or if no signal wires are present, contact your factory-authorized service provider.
Remote Off Inv	The Inverter was turned off by an external signal. This indicates an external signal forcing the Inverter to remain off is active. This type of signal is wired into an Input Contact Isolator and the specific channel is assigned as Remote Off Inverter. This status message is self-clearing. When the condition is no longer present, the message and any control activity tied to the status event reverts to normal.	Check the state of the Remote Off Inverter signal. If this signal is not active, or if no signal wires are present, contact your factory-authorized service provider.
Remote Off Rect	The Rectifier was turned off by an external signal. This indicates an external signal forcing the Rectifier to remain off is active. This type of signal is wired into an Input Contact Isolator and the specific channel is assigned as Remote Off Rectifier. This status message is self-clearing. When the condition is no longer present, the message and any control activity tied to the status event reverts to normal.	Check the state of the Remote Off Rectifier signal. If this signal is not active, or if no signal wires are present, contact your factory-authorized service provider.
REPO Shutdown	The UPS shuts down in response to an active Remote Emergency Power Off (REPO) command.	Press "SILENCE" to silence the audible alarm. Resolve the issue that precipitated the REPO. For safety, the UPS latches an REPO event. There are two ways to clear the latch: 1. Press the Reset pushbutton on the External Interface Board (EIB). 2. From HMI front panel display, press OK button when " Press OK to Reset EPO Latched signal" message is displayed in a dialog box. Verify the REPO is cleared by observing the REPO alarm in the Active Event Window is gone. Restart the UPS by pressing "Startup," "Manual Start," and follow the prompts.
Restart in Process	Automatic Restart is in progress. This message clears when the Automatic Restart sequence is complete.	To complete the Automatic Restart, follow the prompts on the display.
Restart Inhibited	Automatic Restart of the UPS is not allowed because of an external signal. Automatic Restart Inhibit is active when signaled from an external source. The signal is wired into Input Contact Interface (ICI 1).	Investigate and resolve the external signal forcing the UPS to remain off. If you do not have an ICI, or if there are no external off signals input to the UPS, contact your factory-authorized service provider.

**Table 7**    **Liebert NXL alarm and status messages (continued)**

Event Message	Event Definition	Recommended Action
Service Code Active	This event is for informational purposes, and informs the user that Service Code is currently running. This status message is self-clearing. When the condition is no longer present, the alarm and any control activity tied to the alarm reverts to normal.	Under normal circumstances, none. If this message is active, and Service Code is not loaded, contact your factory-authorized service provider.
Temp Sense Fail	An equipment temperature sensor is reporting an invalid temperature. The controls ignore temperatures from a failed sensor.	Press "SILENCE" to silence the audible alarm. Press "RESET" to clear the alarm. If the alarm cannot be reset, or if the alarm condition returns, contact your factory-authorized service provider.
Xfer to Byp Failed	An event (such as an Inverter fault) caused an attempted automatic transfer to bypass and the transfer failed. The controls detect the Static Bypass Switch (BPSS) failed to assume the load and the Inverter was off.	Press "SILENCE" to silence the audible alarm. Check the Event Log by pressing "Status Reports," "Event Log" to investigate why the UPS tried to transfer to bypass and why the BPSS failed. If CB3 is available (as displayed on the One-Line Display), close CB3 to restore power to the load. Press "RESET" to attempt to clear any latched alarms or faults. If conditions appear normal, attempt to restart the UPS by pressing "Startup," "Manual Start" and follow the prompts. Contact your factory-authorized service provider.

## NOTES





# Ensuring The High Availability Of Mission-Critical Data And Applications.

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